

SERO-THERAPY

IN

TUBERCULOSIS.



LOUIS PASTEUR.



BEHRING.

WITH

REPORTS OF CASES, RECOVERIES, METHODS
OF TREATMENT, Etc.



Clinical Excerpts of Sero-Therapy.

No. 1.

ST. LOUIS, MO., U. S. A.

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PREFACE.

We deem it proper in submitting the enclosed clinical excerpts of Sero-Therapy to the profession, in relation to our anti-tubercle serum, to state that our laboratories are under the inspection of the State Board of Health of the State of Missouri, and under the management of thoroughly competent chemists and bacteriologists. Dr. Paul Paquin, who exercises personal supervision in the preparation of anti-tubercle serum by the laboratories, is a bacteriologist and pathologist of large experience, having been a student under Prof. Louis Pasteur, Paris, and Professor of Bacteriology and Comparative Medicine at the State University of Missouri. There he founded and edited the first bacteriological journal ever edited in the United States or in the English language. Later, he established the Laboratory of Hygiene of the Sanitarium at Battle Creek, Michigan. Since 1885 he has given his special attention to tuberculosis from a bacteriological and clinical standpoint.

It is now confidently believed that a specific remedy has been found for pure tuberculosis; that the bacilli can be positively eradicated when the vital energies are not too greatly affected by other micro-organic growth, as streptococci, diplococci, etc., or by any other complication.

Such mixed infections might well be called by a new name, according to their respective microbic causes. They are diseases, however, which will very probably be met in due time by an adequate remedy of mixed anti-toxines, covering the action and product of such germs. Upon this subject the laboratories are now engaged and hope to offer results shortly.

Desirous of convincing the profession of their careful work and its scientific control, the managers of the laboratories respectfully invite all interested medical men to visit the institution and investigate for themselves.

THE NATURE AND HISTORY OF ANTI-TUBERCLE SERUM.

There still exists some confusion in the mind of the medical profession as to the actual nature of Tubercle Anti-Toxine or Anti-Tubercle Serum, whichever name may be most justifiable. Since the publications of Koch on Tuberculine, every organic product for the treatment of consumption, if connected with bacteriology, has been classed under this head; that is, each has been considered the product of the germ itself, or something akin to it.

I beg to say that the serum is just the opposite of tuberculine, or anti-phthi-sine and tuberculosidine, the two latter being a modified form of the original tuberculine of Koch; that is to say, the toxine of the bacilli of tuberculosis. Consequently these substances (unless modified) are *poisons* and not *anti-poisons*. The anti-tubercle serum may be placed in the category of anti-toxine, or anti-poisons, just as diphtheria anti-toxine and tetanus anti-toxine. It is the product of animal nature under the influence of the germs of tuberculosis or consumption and their toxins. In other words, by a proper introduction hypodermically, in the horse, of certain tubercle toxins, nature produces a defensive antidote, which resides in the serum. This product of nature neutralizes, by physiologic action, the poison or toxine, and renders the animal immune to them and the tubercle bacillus itself. The potency of this serum, called anti-tubercle serum for convenience, can be greatly increased by selection of the individual animal and the methods of immunization. In the cases of natural recovery from tuberculosis, and other specific diseases, it appears that the toxine produced by the germs in the blood or tissues of the affected person, leads to the production by nature of anti-toxine, which, in manner stated, destroys the toxine and arrests the growth of the germ, as in diphtheria, small-pox, tetanus, etc. This is the method of nature to cure infections. When the drain on the vital energies is too great in this conflict, the germs and their poisons overcome the cells of blood and flesh, and the patient succumbs. The meagre therapeutic value of Koch's tuberculine consisted in developing in the patient this reaction, during which a defensive anti-toxine is produced, but the vital drain was too great, and disappointment followed the rational hopes of the great scientist. Without this reaction, by which a diseased organism creates defensive forces, the modified tuberculines of any name can accomplish little good in therapeutics.

By placing the draft on the vital energies of the horse and producing the anti-toxine in the serum of *his blood*, we obtain the curative anti-tubercle serum, and give the patient the remedy in a powerful form and *without drain on his own system*. The splendid results demonstrate the great value of this latter method.

The history of anti-tubercle serum may be said to date back as far as 1890, although unpublished work was done before that. In that year Bernheim attempted the transfusion of goat's blood in the treatment of tuberculosis. In the same year Bertin and Picq tried the same treatment in tuberculous rabbits. In 1891 Coupard and St. Hilaire injected dog serum in the trachea in the treatment of pulmonary tuberculosis. Hericourt in the same year treated tuberculosis in man with dog-blood serum. De Schweinitz produced immunization of guinea pigs against tuberculosis in 1894. Babès, another European scientist, experimented with dog-blood serum in 1895. Maragliano treated tuberculosis during the last three years with the serum of the ass; and, finally, Behring himself, of diphtheria fame, claimed in the last few months to have produced an anti-tubercle serum, with which he has arrested tuberculosis in small animals. The researches and experiments of Dr. Paul Paquin on the same line date back several years, but were not clinically applied in human beings until 1894. The comparative study of tuberculosis by him began in 1885, at the State University of Missouri. His studies on the anti-septic properties of serum were begun on during his six or seven years of service in that institution, during the discussions of Metchnikoff, Kitasato, Mitchell Prudden and others, on the causes of immunity. He has experimented extensively on animals, and even, man.

The readers are referred to the works of Dr. P. Achalme on "Sero-Therapy," Krieger on "Blood Serum Therapy," and the publications of Major Sternberg, Surgeon-General of the United States Army, on "Bacteriology," for further information on sero-therapy.

EXCERPTS FROM VARIOUS MEDICAL JOURNALS, REPORTS OF PHYSICIANS, PATIENTS, Etc., Etc.

[Reprint from *The St. Louis Medical and Surgical Journal*, March, 1895.]

Anti-Tubercle Serum.*

First Report of Cases.

BY PAUL PAQUIN, M.D.

PRELIMINARY REMARKS.

It would seem superfluous to say a word here on the pathology of tuberculosis, but the nature of the new treatment demands that we refresh our memory on some points of it before certain therapeutic questions, to be dealt with presently, may appear clear, or at least rational.

The results of my observations and researches have convinced me beyond a doubt that tuberculosis, in the stage of lesions, particularly when pulmonary cavities, intestinal ulcers or other such alterations exist, becomes a mixed infection, due to the introduction of various other pathogenic microbes, besides the bacillus of tuberculosis in the specific wound. Myriads of germs of the air, water, food, etc., gain access to tuberculous lesions and complicate the primary disease to a very grave degree. The destruction of tissue by these germs, the production of new mixed poisons, perhaps more dangerous sometimes because of chemical combinations, are largely responsible for the irregular chills, fevers, and some other pathogenic phenomena to be seen in advanced tuberculosis. These complicated microbic disturbances which so greatly depress and harass the system are, perhaps, assisted in their nefarious work by the toxins generated in a weakened, impaired digestive tube, which, failing to digest the food properly, leaves it the prey of various toxic ferment-manufacturing microbes. It is well to bear these points in mind when considering the anti-tuberculous serum as a therapeutic agent in tuberculosis, for it probably does not affect complicating germs.

On the other hand, in tuberculosis,

we should never lose sight of the natural vital resistance of the exposed, suffering individual. It is this vital resistance of nature that saves the minority who escape all the damaging influences of the disease, and the principles underlying it explain the serum therapy. To understand this vital resistance, its nature and its scope, and to increase it in medical practice, is to wield a powerful weapon against the foe. The cursory method of diagnosis, therefore, merely by the interpretation of physical signs, is not sufficient to put the doctor in possession of all the important facts necessary for an accurate interpretation of tuberculous phenomena and proper treatment. The microscope should be brought into play early and often, not only to discover the existence of the bacillus of tuberculosis, but also to establish the differential nature and state of the organic lesions as far as possible, and to realize the nature and extent of the mixed infection when it exists.

* * * * None of the improvements can be ascribed to mental influences, as it was in nearly every case against the will of the patient that we injected them. For four weeks or more the cases at the City Hospital fought and objected, and it was only after realizing the benefits themselves that they submitted gracefully.

These results certainly point to a decidedly favorable ground to hope for more success. If, in such a short time, under such circumstances, and in such surroundings, viz.: a Poor-House and a City Hospital, one can put fat and flesh on a consumptive, while untreated witness cases, under the same conditions, continually fail, what may we not hope if we give consumptives in the first and second stages, at least, are placed in a modern sanitarium, or kept in their homes even, and surrounded by all the cares that increase good health and the conditions for the rich constructive diet that should be granted such unfortunates? What may we not expect if we give them, furthermore, all the sanitary conditions that may aid nature to cure or arrest tubercu-

*Read before the St. Louis Medical Society, Saturday, January 26, 1895.

losis in any event? I do not forget that changes in condition may increase weight in tuberculous cases; but the cases under discussion have increased in health out of proportion to the others under similar conditions.

RECORDS OF 22 CASES

IN VARIOUS STAGES, TREATED IN ST. LOUIS POOR HOUSE AND CITY HOSPITAL DURING DECEMBER, 1894, AND JANUARY, 1895.

Mike Morley, age 53; pulmonary tuberculosis in the second stage. Had been ill seven years. Family tuberculous. Left lung affected below the scapula at the back; dullness of the left (?) apex. Chest measurement in expiration, 36; inspiration 37½ inches; dilatation of only 1½ inches. Coughed considerably; expectoration yellowish, blood tinged; sometimes pure blood. Began treatment Dec. 1st, 1894; weight, 165 pounds; lung capacity, 110 cubic inches of air. Jan. 26, weight, 170 pounds; lung capacity, 110 cubic inches of air. Increase in weight, in about eight weeks, 5 pounds.

Charles Reck, age 18, began treatment Nov. 29th, 1894; discharged Jan. 3d. Was brought to the City Hospital on a stretcher; could barely rise on his chair to eat. Tuberculosis of the lungs in the third stage; duration two years. Cavity in the left infra-clavicular space; expectorated a good deal of blood and sputum. Gained 19 pounds in a month.

Phil Hye, age 35; pulmonary tuberculosis; second stage; coughed six years; was very emaciated; dullness in both apices. Chest measurement at expiration, 30 inches; inspiration, 31; dilatation of only 1 inch. Coughed constantly night and day; muco-purulent expectoration. Began treatment Dec. 1st; weight, 81 pounds; was sleepless. Jan. 26th, weight, 89 pounds, an increase of eight pounds in less than eight weeks; cough disappeared almost entirely; sleeps well. This patient was very weak on entering the City Hospital; was sent here from Texas, having been given up as hopeless by Dr. J., city physician of El Paso, Texas, and Dr. M., of San Antonio, Texas, who sent him home to die. He had also been condemned as hopeless by Dr. C., of the Alexian Brothers' Hospital of Chicago, where he had been under Koch's treatment. The patient is now around and about.

George Dobson, or Dolson, age 28 years; had been seriously ill two months; pulmonary tuberculosis of the second stage; had had hemorrhage occasionally; dullness in the right apex in infra-clavicular region; expectoration scant. Began treatment Dec. 1st; weight at that time, 107 pounds; weight Jan. 26th, 117½ pounds; a gain of 10½ pounds in less than eight weeks. Lung capacity at the beginning, 100 cubic inches of air; lung capacity Jan. 26th, 150 cubic inches.

John Smith, age 28; pulmonary tuberculosis, second stage; duration, two years; mother died of consumption. Had lost 30 pounds in two years; affection of the left apex; large cavity; adhesive pericardium and pleura; coughed particularly in the morning. Weight Dec. 1st, 145 pounds; Jan. 28th, 154; gain of 9 pounds in less than eight weeks. Lung capacity, 170 cubic inches on Dec. 1st; lung capacity, 180 cubic inches Jan. 26th; increase of 10 cubic inches.

Otto Maya, age 58; pulmonary tuberculosis; had been suffering for several years. Appetite poor; coughed considerably; had slight hemorrhages several times in the morning. Weight at the beginning of the treatment, Dec. 1st, 155 pounds; lost flesh gradually until reached 151 pounds on Jan. 1st. Is now gaining, and has gained 3½ pounds between the 1st and 26th of January. Lung capacity at the beginning of the treatment, 110 cubic inches; Jan. 26th, 160 cubic inches; increase of 50 cubic inches. This patient is one of those who had an abscess during the process of treatment, during which time he lost in weight, without fever. He is now gaining.

Nicholas Robinson, age 61; pulmonary consumption in second stage; duration 2½ years. His mother died of consumption. He had several hemorrhages; night sweats; coughed seriously at night; expectoration great. Affection located in infra and supra-clavicular regions, both sides; dullness quite marked. Weight at the beginning of the treatment, 119 pounds; weight Jan. 26th, 131 pounds. He gained 12½ pounds in less than two months. Lung capacity, 150 cubic inches Dec. 1st; lung capacity Jan. 26th, 180; increase of 30 cubic inches. This patient could not talk when brought to the hospital; was given up as hopeless; laryngeal tuberculosis; was sleepless; now sleeps well, coughs very little, has a good appetite, and feels stronger.

John Cummings, age 49 years. Weight, 90 pounds Dec. 1st; weight Jan. 26th, 106 pounds; a gain of 16 pounds in less than two months. Lung capacity Dec. 1st, 100; lung capacity Jan. 26th, 110; a gain of 10 cubic inches. This man had hemorrhages all last summer and before that, and was almost bed-fast. Very emaciated; bones almost protruding; the nurse was afraid of bed-sores; the case was despaired of; appetite was lost; coughed considerably, and expectorated a great deal. Is now improving continually; is up, and stout, and able to go up and down stairs, and feels in better health in every way. (Is cured of a persistent constipation.)

John Broderick, age 24; pulmonary tuberculosis in the third stage; duration over one year. Brother died of quick consumption. Was very weak, emaciated; had a cavity in the left infra-clavicular region; coughed continuously for two months previous to treatment. Weight Dec. 1st, 105½ pounds; weight Jan. 26th, 113 pounds; an increase of 7½ pounds in less than eight weeks. Lung capacity, 100 cubic inches Dec. 1st; lung capacity has since varied between 110 and 140 up to Jan. 26, 1895. This is one of the two cases who had an abscess in the back. He was almost bed-fast when treatment began; coughed a great deal night and day; was very weak. Now coughs very little; no more pains or distress; is up and about, and on night detail duty.

Henry Riley, age 34; weight beginning of treatment, Dec. 1st, 115 pounds; weight Jan. 26th, 124 pounds; a gain of nine pounds in less than eight weeks. Pulmonary consumption in the second stage; duration, one and a half years; tuberculosis in family; had night sweats, diarrhoea, marked dullness in the right supra and infra-clavicular region; appetite poor; coughed frequently at night; expectoration considerable. Was a very sick man, but has improved, until now he is on detail duty.

James McCafferty, age 48; pulmonary consumption second stage; duration of cough, several years; serious illness in five weeks preceding treatment; spat blood during this period; diarrhoea was frequent; dullness left supra- and infra-clavicular region. Weight at the beginning of treatment, Dec. 1st, 106½ pounds; weight Jan. 26th, 129½ pounds; a gain of twenty-

three pounds in less than two months. Lung capacity at the beginning, 130 cubic inches; lung capacity Jan. 26th, 160 cubic inches; an increase of 30 inches. Was a very sick man; unable to do anything. Is now on duty at City Hospital. Diarrhoea stopped.

Thos. Morrison, age 42; pulmonary tuberculosis, second stage; duration, over three years; had hemorrhages in 1891; cavity in left apex; pronounced dullness, right infra-clavicular region; tubular breathing over same region; appetite poor; cough and expectoration pronounced. Has been in the City Hospital off and on for several years. Weight at beginning of treatment, Dec. 1st, 156 pounds; weight Jan. 26th, 158 pounds. Lung capacity at the beginning of treatment, 160 cubic inches; lung capacity Jan. 26th, 170 cubic inches. Is very slightly better in general health.

John Hopkins, age 48; pulmonary tuberculosis, advanced first stage; two years' duration. Mother died of consumption. Digestion was bad; cough getting continually worse; had lost flesh. Weight Dec. 1st, at beginning of treatment, 137½ pounds; weight Jan. 26th, 144 pounds; increase of 6½ pounds in less than two months. Lung capacity at beginning of treatment, 250 cubic inches; lung capacity varied between then and now between 260 and 270 cubic inches.

Conrad Hogan, age 32; pulmonary tuberculosis in second stage. Family history good. Had slight hemorrhages, night sweats; was getting weaker daily; right apex involved, and coughed considerably. Weight at the beginning of treatment, Dec. 1st, 135 pounds; Jan. 26th, 142 pounds; a gain of seven pounds in less than two months. Lung capacity at the beginning of treatment, Dec. 1st, 180 cubic inches; lung capacity Jan. 26th, 200 cubic inches; an increase of twenty inches.

Henry Willer, age 46; pulmonary tuberculosis, third stage. No family history of consumption. Both apices involved; had hemorrhages; had been ill five years. His disease began with pneumonia. Lung capacity at beginning of treatment, 140 cubic inches; lung capacity to-day is the same. Weight Dec. 1st, 133 pounds; weight Jan. 26th, 132½ pounds; loss of one-half pound. Temperature normal. Expressed himself as feeling in better condition. It is not a favorable case; was losing fast before treatment.

Nile Johnson, age 54; pulmonary tuberculosis, third stage; duration, twenty months; dullness on percussion of the apices; tubular breathing; hemorrhage a year ago; expectoration not very pronounced. Weight Dec. 1st, at beginning of treatment, was not recorded; Jan. 1st, 156 pounds; Jan. 24th, 158 pounds; a gain of two pounds in less than one month. This patient is not a favorable case; has variable temperature and chills occasionally.

Nicholas Schappo, age 56; pulmonary tuberculosis, second stage; two years' duration; night sweats; left apex dull; coughed considerably at night and expectorated very much. Weight Dec. 1st, beginning of treatment, 108 pounds; weight Jan. 26th, 107 pounds; loss, one pound. Lung capacity Dec. 1st, 140 cubic inches; Jan. 26th, 150 cubic inches; increase of ten cubic inches. The man is aged and broken down generally, and is not a favorable case, although he holds his own, and lung capacity is better. This is one of the patients who had an abscess on the back. He was going down hill fast before treatment. General tone undoubtedly improved.

Conrad Opperman, age 47; pulmonary tuberculosis in the third stage; duration of serious symptoms, six months. Mother died of consumption. Has had night sweats; was exceedingly emaciated; very weak; cavity in the right infra-clavicular region; coughed in the morning considerably; has diabetes. Weight at the beginning of treatment, Dec. 1st, 79 pounds; weight Jan. 26th, 82 pounds; increase of three pounds in spite of diabetic phenomena. Lung capacity at the beginning of treatment, 50 cubic inches; has varied since then between 50 and 70. This man was a stretcher case, brought to the hospital helpless; could not get up the stairs for a long time, even after he began treatment; was very thin. Is now improved; coughs no more; is in better health; has better appetite; sleeps better.

Fritz Arnold, age 59; pulmonary tuberculosis, second stage; duration two years. Tuberculosis in the family. Cough persistent; expectoration profuse; appetite bad. Weight beginning of treatment, Dec. 1st, 122 pounds; weight Jan. 26th, 127 pounds; a gain of five pounds in less than two months. Lung capacity Dec. 1st, 70 cubic inches; lung capacity has since varied between 80 and 110. This is a broken-down constitution generally, but has

improved in spite of it, whereas he was steadily declining before.

William Murray, age 41; pulmonary tuberculosis, second stage; duration, one year. Family history good. Is a drinking man. Consolidation right apex; night sweats; bloody sputum; appetite poor; coughed a great deal; expectoration profuse. Weight Dec. 1st, 132 pounds; weight Jan. 26th, 134½ pounds; gain 2½ pounds. Lung capacity at the beginning of treatment, 70 cubic inches; lung capacity Jan. 26th, 120 cubic inches; gain of 50 cubic inches.

Thos. Bennet, age 64; pulmonary tuberculosis, second stage. Been coughing four months; very emaciated; affected with long-standing gastritis. Right supra-clavicular region involved; dullness; lungs emphysematous; appetite poor; coughed considerable; sputum sometimes tinged with blood. Weight Dec. 1st, at beginning of treatment, 125 pounds; weight Jan. 26th, 130 pounds; gain of five pounds. Lung capacity stays at 110 cubic inches.

Martin Lemp, age unrecorded. Weight at beginning of treatment, Dec. 1st, 131½ pounds; weight when discharged, Jan. 10th, 151 pounds, making an increase of 19½ pounds in six weeks. Lung capacity increased from 170 at beginning of treatment to 190 when discharged; a gain of 20 cubic inches.

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Paquin's Anti-Tubercle Serum in Laryngeal Tuberculosis.*

BY HANAU W. LOEB, A.M., M.D.,

ST. LOUIS.

Professor of Diseases of the Nose and Throat in the Marion-Sims College of Medicine; Laryngologist to the Rebekah Hospital, Missouri Pacific Hospital, Grand Avenue Free Dispensary, and E. St. Louis Prot. Hospital, Etc.

I have been impelled to use Paquin's antitubercle serum in cases of laryngeal tuberculosis by reason of its positive utility in pulmonary tuberculosis. I have during the past six months seen so many patients with pulmonary tuberculosis improve under the use of this serum that, so far as I am concerned, it deserves to be placed with the antitoxine of Behring and Roux as a great advance in modern scientific therapy.

A considerable number of cases of

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laryngeal tuberculosis have come under my observation during the past six months, giving a good opportunity to test the value of the serum in this disease. While no conclusive report could under any circumstances be made, so recently supervening upon its use, a more or less detailed account of the clinical experiences with the use of the antitubercle serum may be of service to my colleagues in laryngology. Every case of laryngeal tuberculosis that has come under my observation from February 28, 1895, until the present time is here noted, in order that the record may be as complete as possible.

CASE I.—J. V., aged thirty years, married, a latter by occupation, consulted me first in May, 1894, being referred by Dr. R. G. Taylor, of St. Louis. His previous history was as follows:

After an exposure to cold and dampness in March, 1894, his complaint first manifested itself, beginning with a chill, night sweats, and pain in the chest. He began rapidly to lose flesh and strength, and in two months he lost twenty pounds. He consulted me in May, 1894, with reference to a nasal affection, which was nothing more serious than a chronic inflammation of the nose resulting from a very greatly deflected septum.

As he was evidently a tubercular subject, in view of his general condition, he was advised to leave this climate; and, acting upon the advice, he left at once for Texas. Some six months afterward I received a letter from him stating that he had not improved, but had become worse, and on February 28, 1895, he again presented himself before me in far worse condition than when he left. A new series of symptoms had appeared; his voice had been hoarse for four months, at first unaccompanied by pain, though he complained of a raw feeling about the throat. A month afterward pain in the throat developed, and this had continually increased since that time. With this increase of pain there had been also an increase of difficulty of deglutition and phonation. His family history was fairly good. His mother died after living fifty years in good health, and his father died at forty of consumption. No other tuberculosis had existed in his family.

Physical examination showed retraction of right side of the chest, dullness on percussion over right apex, with blowing respiration, cogwheel respiration, mucous click, and bronchophony.

On the left side there was a slight dullness at the apex with prolonged expiration. Examination of the larynx revealed the tissue above the arytaenoids and ventricular bands and the arytaeno-epiglottic folds considerably infiltrated. There was an ulcer three-eighths of an inch long upon the right arytaeno-epiglottic fold and a smaller one at the left. Both ulcers were narrow. Both cords were congested, the right being serrated. Many tubercle bacilli were found in his sputum. A very unfavorable prognosis was given, but, inasmuch as he desired to have other opinions upon the subject, he was advised to consult other laryngologists in the city. Dr. Mulhall, after examination, stated that the patient had both throat and lung consumption, that the outlook was serious, with or without the aid of climate; that even with a change of climate the chances of recovery were slight. Dr. Porter stated that the arytenoids were somewhat swollen, the mucous membrane over them being quite red; that the ventricular bands were greatly infiltrated, and on each side were small ulcerations with a characteristic ashy gray color; that the lungs had not progressed so far as is usual in this condition of the throat, but that there was marked dullness at the right apex. Dr. Glasgow stated that he found tubercular infiltration of the upper part of the right lung and also laryngeal phthisis, and advised a dry climate that was not too stimulating, stating that the climate of St. Louis was unfavorable to the arrest of the disease. Dr. Karl von Ruck, Dr. F. L. Sutton, and Dr. G. C. Crandall have at different times examined the patient, and agreed in the diagnosis. The patient was then informed that the Paquin antitubercle serum offered a slender chance if nothing more. He was told that no case of laryngeal tuberculosis had as yet been treated by the remedy, but that considerable good had been accomplished during the previous four months in the treatment of pulmonary tuberculosis. He willingly underwent the treatment, which he soon found was both painless and harmless.

He entered the Rebekah Hospital on March 4th, with a temperature of 100 degrees F., and he was at once subjected to a course of serum treatment, beginning with doses of one cubic centimetre. After a few days the cough, which had been quite harassing, became easier. Some soreness and itching in the axilla and back were expe-

rienced, and on account of this the use of the serum was discontinued for a day from time to time, the result of which was the establishment of a tolerance within three or four weeks. The voice soon began to show signs of improvement, becoming quite phonic within six weeks. The pain and dysphagia improved coincidentally. Dr. Lemen reported considerable improvement in the condition of the lungs. His weight increased, his appetite improved, and the amelioration of his general condition was very evident. During his stay in the hospital he had occasional relapses, which were readily ascribable to acute or subacute inflammation of the pharynx or larynx, due to some indiscretion. He continued to improve, and on May 6th he left the hospital, having entirely lost the symptoms of pain in the larynx, dysphagia, and night sweats; cough and aphonia greatly bettered. Examination of his larynx showed infiltration greatly reduced, ulcers smaller though quite manifest. The serum was continued, injections of 2.3 to three cubic centimetres being given daily during the following six weeks. He then voluntarily ceased his visits and did not resume treatment for four weeks. When he again presented himself for treatment, it was found that during the interim his cough and aphonia had become worse, and some pain upon swallowing had reappeared. The serum was again used, with results agreeing wholly with his former experience. He accepted a situation, and for the first time since the onset of the disease he was able to work. Of late the doses of serum have been increased gradually, until at the present time (September 1st) he takes four cubic centimetres hypodermically every day. The larger doses have produced more rapid improvement and, notwithstanding his work is arduous, he experiences no trouble whatever, barring a huskiness of his voice and a tendency to congestion of the larynx. Dr. Lemen reports that his lungs give no evidence of the presence of abnormal discharge.

Status Praesens.—The entire larynx is of a redder tinge than normal; slight infiltration of arytaenoids and arytaeno-epiglottic folds and ventricular bands; cords slightly congested; margins of the ventricles thickened; ulcers have entirely disappeared, two small shallow pits, uncovered by deposit, taking their places. For six months I have endeavored to persuade him to permit the use of some application to

his larynx, but he has absolutely objected to any laryngeal manipulation, and during the entire course of treatment no local agent has been used on his larynx. Besides the serum, no medicinal agent has been administered. During the past five months the temperature has been close to normal, seldom rising to 99 degrees, although previous to the use of the serum, the afternoon temperature was always at least 100 degrees. Some tubercle bacilli are still to be found, but they are manifestly diminishing in number. His weight has increased ten pounds since the beginning of the treatment; before he began work his weight was a few pounds greater; he ascribes the reduction to the hot weather and the hard work. His appetite and general condition are better than for years.

CASE II.—Mrs. D., aged thirty-three years, entered the sanitarium on May 5, 1895, giving the following history:

Three years ago she was severely attacked with grippe, which was followed by symptoms of pulmonary tuberculosis; these had rapidly become worse, and upon admission her condition appeared altogether hopeless. Emaciation was extreme, dyspnoea was great, night sweats were profuse; anorexia, exceedingly poor assimilation, and diarrhoea united to depress the patient's condition. Some four months previous to her admission she became affected with typical symptoms of laryngeal tuberculosis, pain, dysphagia, odynophonia—all of which had rapidly become worse. The urine was scanty and contained traces of albumin, but no sugar. The temperature varied from 102 degrees to 103 degrees in the evening to 100 degrees in the morning. The lungs showed signs of scattered circumscribed cavities. There was dullness at both apices, with gurgling and cavernous respiration and crackling crepitation in both lungs. The cavities were well defined by a margin of tubular breathing. The cracked-pot sound could not be elicited.

Upon examination, both arytaenoids were found pyriform, the inner margin of the right one being the seat of a typical tubercular ulcer as large as a grain of wheat. Both ventricular bands were infiltrated, but the cords showed no evidence of disease. Tubercle bacilli and many other bacteria were found in large numbers.

Although Dr. Paquin, under whose attention the patient placed herself, stated that the antitubercle serum could do no good in such a hopeless

case, the patient and her family insisted on a trial. Accordingly, she was placed under treatment at once, with results far better than were expected. Though she died on July 6th, sixty-two days after her admission, improvement in the visible morbid processes, and in the objective as well as subjective symptoms, lent stronger confidence in the efficiency of the serum than had previously been entertained. As early as two weeks after the beginning of the treatment the pain in the throat and the dysphagia began to diminish, and at the same time the appearance of the larynx became more favorable. In a month the improvement in the throat and pulmonary symptoms was much more marked, and the temperature had decreased two or three degrees. The bowel symptoms began now to be more severe, so that it was found impossible to control the diarrhoea. On June 29th she was seized with fainting, and the temperature descended below normal. Shortly afterward she passed some blood per rectum. From this time she rapidly became worse, although seemingly unusually sustained (perhaps by the serum). The local treatment consisted of the use of lactic acid and Chappell's solution; still, I must confess that the laryngeal appearance improved far more than was to be expected from these remedies. In this case the subsidiary infection was extreme, and therefore the effect of the serum is all the more remarkable.

CASE III.—Mr. F. R., aged thirty-four years, by occupation a farmer, entered the hospital on May 30, 1895, with the following symptoms Considerable cough; loss of flesh; great difficulty of swallowing; huskiness of voice; night sweats; dyspnoea on exertion; pain in the throat; duration of illness, sixteen years. The throat had been affected for three months. The voice had been husky for some time, but he had never been entirely aphonic. The difficulty of swallowing was very considerable, becoming worse as the disease progressed. He had had only a few hemorrhages. He was very much debilitated, so much so, in fact, that a cure was not to be hoped for. He denied having had syphilis. Both his parents had died under forty; the father was killed, the mother died of consumption at thirty-three.

The physical signs indicated consolidation in both lungs, softening, and a large cavity at the apex of each lung evidenced by the cracked-pot sound,

gurgling and bronchial breathing; there was a smaller cavity on the right side. Examination revealed nothing abnormal in the nasal cavity beyond a mild chronic inflammation. The palate exhibited the customary anaemia. The larynx showed evidence of disease existing for some time. There had evidently been a destruction of the right cartilage of Santorini, and both ventricular bands and arytaeno-epiglottic folds were subject to great infiltration. Only the edges of the vocal cords were visible, on account of the excessive infiltration. There was an ulcer upon the apex of each arytaenoid, about three-sixteenths of an inch in diameter; both were covered with a dirty grayish deposit. The epiglottis was considerably infiltrated, the upper edge being four times as thick as normal. The entire larynx was constantly bathed with a fairly tenacious yellowish deposit. The sputum showed many tubercle bacilli and cocci in large numbers.

The prognosis in this case, as may be supposed, was not very encouraging, in view of the extreme emaciation, the great destruction of the lung, and the mixed infection accompanying. In spite of this, however, he insisted on treatment, which was at once begun. The temperature ranged from 102 degrees in the evening to 99 degrees in the morning, but soon began to diminish, and at the end of ten days the evening temperature rose to 100 degrees. During the following week the temperature did not rise above 100.4 degrees, and ranged within half a degree of 99 degrees. A week later the temperature was even lower. The larynx exhibited considerable improvement, the epiglottis losing much of its infiltration, and the difficulty of swallowing greatly diminishing. The ulcer over the right arytaenoid showed signs of recovery, healing granulations being quite observable, and the dirty grayish deposit becoming scantier.

The local treatment of the larynx consisted of the use of a two-per-cent spray of menthol and applications of a fifty-per-cent solution of lactic acid, with occasional applications of a solution of creosote with Chappell's syringe. The patient left the hospital on June 27th, with an improved condition of his larynx and lungs, but without any marked amelioration of his general condition.

CASE IV.—Mrs. C. K., aged forty-two years, on July 6, 1895, gave the following history: For three months she had

suffered from hoarseness, pain in the throat, dysphagia, a sensation of fullness about the throat, dyspnoea on exertion, night sweats, and cough, which had all increased during this time. Both parents were still living, and one brother had died (of lung trouble).

Physical examination showed consolidation at both apices but no cavity.

Bacilli were found in the sputum in fairly large numbers. The nose, pharynx, and palate were fairly normal; both tonsils atrophied; epiglottis normal; both arytaenoids very slightly infiltrated; an ulcer of about the size of a grain of wheat upon the posterior extremity of the right vocal cord. Her general condition was fair, but her weight had been decidedly reduced since the onset of the disease.

The effect of the serum was especially marked upon the ulcer, which has diminished greatly, until at present a rough, pinkish patch marks its former position. Hoarseness, dysphagia, and pain have proportionately disappeared. Her general health has improved, and the cough and night sweats have diminished.

CASE V.—Mr. J. O., aged thirty-four years, single, presented himself for treatment July 12, 1895, with the following symptoms: Aphonia, dryness of the throat, pain in the larynx, with dysphagia since September. Considerable nasal discharge, but no throat symptoms other than has been stated. The cough is very bad generally during the day; expectoration muco-purulent; great dyspnoea on exertion; no night sweats. He has had several slight hemorrhages, and has lost thirty-seven pounds since last September. His father died at thirty-six of pneumonia; his mother is still living, aged fifty-four. His general condition is very poor; he looks almost cachectic. His stomach is the source of much trouble—nausea, vomiting, and lack of assimilative power being rather constant symptoms. He had syphilis in 1888. Tubercle bacilli and other bacteria were found in large numbers in his sputum.

Examination of the Chest.—On inspection, depression of the right apex, with dullness as far down as the fourth intercostal space; greater dullness over the left apex. Many rales were to be heard over both lungs.

Examination shows the nasal cavities wide, the pharynx congested, but the palate pale. Both tonsils are atrophied. Some infiltration over arytaenoids; left vocal cords considerably infiltrated, es-

pecially on the anterior extremity. Right cord covered with a thin deposit of new tissue near its junction with the thyroid.

Upon treatment, the pain and dysphagia rapidly diminished, and after three weeks he suffered no longer from these, but the aphonia was but slightly improved. No very great change was observable in his temperature, which had been quite variable and irregular since his admission. During the first week it reached 103 degrees, and was commonly above 102 degrees in the evening. During the last week in August it reached 102 degrees only once, and the evening temperature was generally nearer 100 degrees. General condition much improved.

CASE VI.—Mrs. A. G., aged forty years, first examined on July 20, 1895. She has complained since June, 1894, of huskiness, hoarseness, a tickling sensation of the throat, and considerable pain on deglutition, and attributes all her symptoms to exposure at that time. She has lost much flesh and is fairly weak. Cough considerable, expectoration muco-purulent; night sweats slight. She has had only one hemorrhage—in November, 1894. The pain is mainly localized on the right side of the larynx. Difficulty in swallowing has lately increased so greatly that she is able to swallow only small pieces. Her father is still living, seventy-one years of age, in good health; her mother died at sixty-nine, of abscess of the liver. One brother died of consumption at thirty-four years. Previous history good. Bacilli and other germs were found in the sputum.

Examination of the lungs by Dr. Paquin and Dr. Lemen reveals the following: A fairly large cavity in the right sub-clavicular space, surrounded by an area of consolidation; left lung consolidated at its upper extremity.

Examination of the Nose and Throat.—Right nasal cavity normal, mucous membrane soggy and anaemic; rhinopharynx subject to chronic congestion; pharynx presents a few granulations. Both tonsils atrophied; palate of good color. Varices in considerable number on the posterior surface of the tongue. Larynx greatly infiltrated, also the arytaenoids, arytaeno-epiglottic folds, posterior laryngeal wall, and ventricular bands; small ulcers on the inner surface of both arytaenoids. The infiltration of this larynx was extreme—in fact, greater than I have heretofore seen; the epiglottis was fairly normal,

accounting, perhaps, for the possibility of any deglutition.

The patient's evening temperature on admission was 103 degrees; the next day it was 104.8 degrees; and for some time afterward it ranged about the 104 degree mark. The morning temperature was normal or just below. The number of respirations was over forty, going down as low as thirty when the temperature was lower.

Serum was used in this case in increasing doses, beginning with 1.6 cubic centimetres; at present four cubic centimetres are used. Submucous injections of Chappell's solution (one drop) were made in the apex of the infiltrated left arytaenoid on August 8th, and in a similar position on the right side on August 26th. The solution was injected daily into the larynx, and spraying of a two-per-cent menthol solution was administered four times a day. Even before this local treatment had time to become in any way effective—in fact, before it was used—the patient began to improve, the temperature declining and the respirations diminishing in frequency. The throat symptoms improved, and the patient felt far more comfortable. On August 9th the right arytaenoid became more swollen, and for ten days the condition of the larynx was somewhat worse, and this was due, I think, to the development of a perichondritis. Since that time she has gradually improved, until at the present time the throat gives her far less trouble. It is interesting to note the gradual diminution of temperature. From an evening temperature of 104 degrees it has descended to 102 degrees, showing almost as marked a decrease as in the fourth week of typhoid fever. While the patient's condition is still serious, I think it will be admitted that the six weeks of serum treatment have resulted favorably and that the promise is fairly good.

CASE VII.—Mr. H. C. B., of Griggsville, Ill., was referred to me by Dr. Cale on July 23d. For eighteen months more or less hoarseness had been present, unaccompanied by pain until within the past three weeks; he was just beginning to have slight difficulty in swallowing. Cough quite severe, expectoration muco-purulent. He had had night sweats, but they had been absent for some time. The only tuberculosis in his family was in the case of his father, who died at fifty, of pulmonary tuberculosis.

Microscopical examination showed abundant tubercle bacilli.

Examination of the Nose and Throat. —Nose normal; mucous membrane pale; palate and epiglottis anaemic; tonsils atrophied; moderate infiltration of the ventricular bands and arytaenoids; posterior wall also infiltrated. This was evidently an early case of laryngeal tuberculosis, and he was at once put under vigorous treatment with anti-tubercle serum. For his laryngeal affection, menthol spray, inhalation of compound tincture of benzoin, and occasional applications of lactic acid were used. After three weeks of treatment his condition improved considerably, so much so, in fact, that it was deemed wise to send him home for his family physician to continue the serum treatment, as the larynx required slight, if any, attention. The infiltration appeared slightly reduced.

CASE VIII.—Miss J. M., aged twenty-eight years, was referred to me by Dr. Fulgham, of Jackson, Miss., with the following history: For five years she had suffered from tuberculosis pulmonalis, which condition had been held fairly in check by judicious climatic therapy. While at times she had been reduced in flesh and strength, she had quite as often regained them. She had had only one hemorrhage. While her throat had been for years a source of trouble to her, it had been very much worse since January. Since that time there had been great pain in the region of her larynx, which was increased by deglutition, and which showed no tendency to improve. Her voice was not materially affected. There had been no tuberculosis in her family.

The lungs exhibited dullness at the right apex, with prolonged high-pitched expiration, also some dullness on the left side. Tubercle bacilli were present in the sputum.

Both arytaenoids were found considerably infiltrated and heightened in color; the infiltration extended downward to the posterior wall of the larynx and forward for some distance along the ventricular bands and the arytaeno-epiglottic folds. No ulceration could be distinguished. Both cords appeared normal.

Serum treatment was advised, accompanied with appropriate laryngeal applications. She returned home without submitting to treatment at my hands, her physician, with my concurrence, deciding to use the serum at home for a time.

CASE IX.—E. A., aged thirty-three years, a conductor, entered my division of the Missouri Pacific Hospital on August 23d. For five months he had complained of dysphagia, hoarseness, and pain in the larynx. This latter symptom was a trifle better than it had been. Cough slight. Expectoration muco-purulent; night sweats occasionally; slight hemorrhage on August 22, 1895; no dyspnoea except on exertion. Since February he had lost twenty-two pounds in weight. He stated that he had had "bronchial trouble" for six years. Five years ago he acquired syphilis, and his present trouble had been ascribed to this by at least one laryngologist.

Tubercle bacilli were found in great numbers in his sputum.

Examination revealed a greatly tumefied epiglottis, the swelling being on the anterior surface. This held the epiglottis well over the larynx, so that an examination of the lower portion was possible only after great patience and care. The posterior walls of the larynx and the tissues above the arytaenoids were characteristically pale and infiltrated. No ulceration was discoverable. This patient suffers possibly from both tuberculosis and syphilis of the larynx, but the chances are that the greater source of trouble is the tuberculosis. Iodide of potassium in large doses, which he bore fairly well, considering the condition of his throat, effected no change in the larynx or in the laryngeal symptoms.

During the few days required for examination the dysphagia and pain have increased.

Patient has been under a vigorous course of serum treatment.

The further progress of these patients will be given in a later paper.

In all cases, as a matter of course, great attention was paid to dietetic and hygienic indications; in the more desperate cases stimulants were administered; in the more favorable ones, viz., Cases I. and IV., nothing in the way of tonics or general remedies was used. Pasteurine tablets were given in all the cases, as they exert an admirable influence in keeping the mouth clean and the breath inoffensive. As was to be expected, the serum did not exhibit so happy an effect in the cases of mixed infection as in the earlier cases where the tubercle bacilli alone were implicated.

Without any allegation of conclusive proof, these unselected cases exhibit a more favorable course than any

which have come under my observation previous to my use of sero-therapy in laryngeal tuberculosis. Taken as a whole, they suggest a far better prognosis than is generally accorded to the disease. Case I. is almost remarkable. Examined by five laryngologists and given a hopeless prognosis by all, the patient represents the strongest proof of the value of the antitubercle serum. Add to this the fact that no local treatment was used, on account of his absolute refusal to permit it, and the proof becomes enhanced. There can be no doubt about the diagnosis, since the opinion of so many laryngologists who examined him demands absolute and unqualified belief. True, some cases of spontaneous recovery have been reported; still, in this case the following facts are to be considered. His improvement was coincident with the use of the serum; his symptomatic amelioration bore a direct relation to the amount of serum used. When the serum was discontinued for four weeks, his cough increased, his voice became less phonic, his difficulty of swallowing returned, and pain and other symptoms reappeared. All these rapidly disappeared when treatment was resumed. More than this, he improved correspondingly more when the doses of serum were increased from two to four cubic centimetres.

Cases II. and III. are examples of results in hopeless cases. In both, the pulmonary tuberculosis had advanced far into the third stage, with extensive laryngeal involvement and mixed infection, and both patients, after great emaciation, accepted sero-therapy as a last resort, though they were advised of the utter hopelessness and futility of treatment. In spite of this the condition of both was greatly improved, and not only was the laryngeal tuberculosis, which is so typically progressive in its course, stayed, but the change in the characteristic symptoms and appearance denoted great progress toward resolution.

In view of the results which have thus far been obtained, it is fair to assume that more extended observation and experience will open the field more largely; I even expect that the solution of the vexed problem of the relief and cure of laryngeal tuberculosis may have serotherapy for its basis, and that other therapeutic agents are purely adjuvant, as they attack the morbid processes without affecting fundamental conditions.

A number of therapeutical possibilities may properly be considered:

I. Early Tracheotomy.—It is well known that tracheotomy improves, for a short time, almost all cases of laryngeal tuberculosis, presumably on account of the rest which this operation affords the larynx. The improvement which took place in the larynges in all the cases presented in this paper encourages the hope that tracheotomy will still further augment the chance of recovery and hasten the amelloration. Thus far in none of my cases have I felt warranted in attempting such a radical measure early in the course of the disease, but I feel sure that good may in this way often be accomplished.

II. Curettement, Arytaenoidectomy, and Similar Operations.—These operations which have been presented so scientifically by Heryng, Krause, Gouguenheim, Lennox, Browne, Gleitsmann, Schmidt, and others, have won a place in the treatment of laryngeal tuberculosis which far surpasses that of any other plan heretofore advocated. Combined with sero-therapy, whereby a generally improved constitutional condition is practically warranted, this plan is by all means inviting. However, it may well happen that closer study will demonstrate that some of the conditions now thought irremediable without curettement may show a special tendency to reduction by the use of serum. Again, the serum itself offers a field for improvement which will enhance the results already attained.

III. Submucous and Intralaryngeal Injections.—Chappell, by the use of submucous and intralaryngeal injections of his creosote solutions, has accomplished a great advance beyond all question. I have seen many of his patients, and I can testify to the value of his method. The one thing which seems to be lacking was the uncertainty of securing relief from the accompanying pulmonary affection. This lack I consider is probably supplied by sero-therapy. In my own hands, as shown by the reports of cases, Chappell's method has been attended with fair success. In Case II. it was not so favorable, however; the disease had obtained so decided a foothold, and the infiltration was so excessive, that very little was to be expected. Case III. demonstrated the soothing effect of the treatment; in Cases V. and VI. the patients improved under its use.

A still brighter possibility attaches to the use of sub-mucous injections of antitubercle serum into the affected portions of the larynx. If, as it appears, the serum is antidotal to the poison of the tubercle bacilli and prevents the growth of the micro-organism, there is every reason to expect that this influence will be increased by bringing the agent in close proximity with the morbid process. I have done this in a single instance, too recently to afford any marked results, but sufficient, I consider, to demonstrate its probable harmlessness. In this connection it must not be forgotten that mixed infection may show in the larynx the same prominence that it does in the pulmonary affection; its closer study may modify our views and establish the exact role which sero-therapy is in this connection to play in laryngeal tuberculosis.

IV. Topical Applications, Sprays, Etc.—I consider that these agents are necessary in practically all cases. While the local condition is largely dependent for its origin and development upon the pulmonary affection, it is still a local condition, requiring local treatment quite as much as if it existed upon the skin or at some more accessible point. Lactic acid will always have a place in the treatment of tubercular ulceration of the larynx. Menthol sprays, inhalations of compound tincture of benzoin, iodoform, and remedies of this character will continue of service, whatever the ultimate outcome of the serum treatment of laryngeal consumption.

V.—Serum as a Sole Curative Agent.—The experience in Case I. would naturally lead one to infer that the antitubercle serum alone in laryngeal tuberculosis might, in at least some cases, accomplish a cure. If the diphtheria antitoxic serum can destroy the action of the Klebs-Loeffer bacilli in the pharynx, larynx and nose, and if the tetano-antitoxine can obviate the local action of the tetanus bacilli, why is it not possible to negative the action of the tubercle bacilli in the larynx by using the serum obtained by immunizing the horse against tuberculosis? True, one need not expect so rapid a result in a chronic disease as in an acute affection; still, it is quite as possible and is to be expected. The results can never be so marked in laryngeal tuberculosis as in pulmonary tuberculosis, on account of the poorer blood and lymph supply of the former as compared with the latter.

In conclusion, permit me to state that I entered upon the use of the Paquin antitubercle serum with two antagonistic thoughts uppermost in my mind. In the first place, there arose before me the lesson of the past, with its dry bones of disapproval and discarded remedies, once vaunted to the skies. On the other hand, there arose before me the lesson of the future, with its hopes and prospects, hopes amply based upon the improvements already made by the application of bacteriology to surgery and the newer principle of the cure of disease by the use of immunizing serum in other diseases.

Confirmation has been offered by Professor Maragliano, of Genoa, in a paper read before the British Medical Association, in which he professes to have had twenty recoveries from pulmonary tuberculosis treated by antituberculous serum. Marson (*Lancet*, p. 330, No. 3754) reports, out of thirty-eight cases of tetanus treated by various physicians with tetano-antitoxine, twenty-five recoveries. Klein, at the recent meeting of the British Medical Association, said of the diphtheria antitoxine "Although certain adverse criticisms have been brought forward against its use, one thing, I think, can not be gainsaid—namely, that the scientific basis for the application of antitoxic serum is as firmly founded and as thoroughly established as the use and application of any known drug." Washbourn, at the same meeting, said: "The principle is one that appears to be applicable to all bacterial diseases." I myself expressed a similar opinion in a discussion before the St. Louis Medical Society in January, 1895, stating that it was only a question of time when the active principle would be isolated. Quite important, too, are the observations of Lemen and Wiggins on the use of the antitubercle serum in the treatment of acute tuberculosis, as well as those of Cale in the treatment of surgical tuberculosis. Again, Dr. Paquin's original and subsequent papers exhibit results in pulmonary tuberculosis unattainable by any other plan of treatment. With these opinions and with my own results thus far, need I apologize because my first hopes and fears have been replaced by a sanguine feeling that sero-therapy offers better possibilities than anything heretofore suggested for the relief and cure of laryngeal tuberculosis?

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A Case of Acute Tuberculosis Treated with Dr. Paquin's Anti-Tubercle Serum.— Recovery.*

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ST. LOUIS.

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To the kindness of Dr. Lloyd Simpson, the attending physician, with whom I saw the case reported below a number of times in consultation, I am indebted for these full notes:

R. C. G., aged sixty years, was attacked with la grippe March 17, 1895. Two days later, March 19th, I visited the patient in consultation with Dr. Simpson. We found pneumonia of left lung, lower lobe; the respiration twenty-six in a minute; temperature, 104.5 degrees F.; urine, dark color, rather small quantity; specific gravity, 1.025; and upon examination by microscope, blood and pus corpuscles were found.

March 20th.—Dr. Simpson, Dr. Tuholkske, and myself saw the patient. The pneumonic process had extended, the left lung being quite extensively involved; respirations, 30 in a minute; temperature, 104.5 degrees.

The pneumonia continued until the ninth day, the temperature ranging 103.5 degrees in the morning, 104.5 degrees evening; the respiration during the pneumonia ranging between 30 and 48 in a minute. The temperature and respiration returned to normal in nine or ten days, the lung cleared up, and the patient improved for some days, when the temperature commenced to be irregular, falling below normal in the morning, 97 degrees, and rising from 101.5 degrees to 102.5 degrees in the evening. The cough returned so that the paroxysm became very severe, a tough, fibrinous sputum being expectorated. This later changed to frothy mucous. The area of dullness over the left lung again increased so that the dullness extended almost to the apex; night sweats were very severe, and the patient's general condition was grave. Upon further consultation Dr. H. Tuholkske, who was again called, together with Dr. Simpson and myself, saw the patient on April 19th, when tubercular infection was suggested by Dr. Tuholkske as the possible explanation of the symptoms present at that time. A

specimen of sputum was preserved and examined by Dr. Ravold, the board of health microscopist, who reported a large number of tubercle bacilli present, and the case was diagnosed as one of acute tuberculosis.

Upon report of this condition to the family they desired additional medical aid, and asked that Dr. P. G. Robinson meet us in consultation; and on April 22d, Dr. Robinson, Dr. Simpson, and myself saw the patient and substantially the same condition reported above was found—acute tuberculosis—Dr. Robinson remarking that “the outlook for the patient’s recovery was very gloomy, but that the treatment to be tried was the Paquin antitubercular serum, as suggested by Dr. Lemen,” so that the serum was commenced on this date, April 22d, and thirty drops given him, the temperature at this time being 102.5. On April 23d another injection was given, the temperature falling to 100 degrees. This treatment has been continued ever since. The temperature became normal on the fourth day of treatment, the cough improved, the patient slept much better, and has continued to improve. After taking serum for two weeks, however, there was a slight, painful swelling of the left ankle, which was supposed to be due to the serum. This continued for two weeks and then disappeared.

May 10th.—The temperature of the patient rose daily to 100.5 degrees for three days, and then became normal; this rise was ascribed to serum. The appetite has been good since improvement began, and the patient has gained flesh, weighing at this time a hundred and eighty pounds, a gain of about forty pounds. On July 1st a specimen of sputum was given to Dr. Ravold, of the city board of health, who reported no bacilli. Again, on July 7th and July 12th, specimens were examined by the same party, and no bacilli were found.

Thus, taking the three examinations without finding bacilli, and the fact that the improvement of the patient has been so remarkable, it seems to me that the chances are that the bacilli have entirely disappeared, and, considering the condition of the lungs, the fact that they have cleared, and that the patient is now getting plenty of air and is breathing well, I certainly think that the marked improvement must be due to the serum treatment, as I have never before seen a case of acute tuberculosis improve much under any treatment, and then only temporarily, with the same termination, death,

as the inevitable outcome of the struggle.

I do not want to seem over-sanguine in regard to this treatment, but the results obtained in this case, and the benefit to three other patients that I have under my care, lead me to believe that much may be expected from serum therapy in the future.

[From the *Medical Review* of Sept. 21, 1895.]

Sero-Therapy in Bone and Joint Tuberculosis.*

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As the surgery of tuberculous bones and joints constitutes such a large proportion of operative cases in the practice of most surgeons of the present day, I feel confident that any improvement in the treatment of this disease will be deemed worthy of record.

Surgical tuberculosis is of far more frequent occurrence than is generally supposed. Kocher states that 90 per cent. of the bone and joint cases in his clinic are tuberculous.

Tizzoni in Italy has lately examined lymphatic glands of 47 persons apparently in perfect health who met violent deaths, and strange to say, found tubercle bacilli present in 43 of the subjects.

The formerly so-called scrofulous glands were simply cases of tuberculosis.

Tuberculous disease of the female pelvic organs is not so rare as was formerly supposed, and I quote from an interesting article by Williams, of Cardiff, which appeared in the “British Medical Journal” of May 4, 1895, in which he said: “The post mortem investigations of Pollak, Kiwisch, Courty, Schramm, Cornil, Zweigbaum and Whitridge Williams has thrown considerable light on its frequency, and according to these authorities the disease was met with in from 1 to 8½ per cent. of the cases examined. In 100 necropsies examined by myself, tuberculosis of the female pelvic organs was encountered in three cases, among them a case of primary tuberculosis of the fallopian tubes and uterus.”

There are several reasons for the

*Read before the Missouri State Medical Society, at Hannibal, May 21, 1895.

enormous number of cases of bone tuberculosis in children, but the first and most important one is the peculiar histological structure of the bones. During their growth the bones are supplied with new, growing and imperfectly developed capillary vessels; this is more noticeable at and in the vicinity of the epiphyseal lines. These vessels are peculiar in that they are larger than the arterial branches from which they are derived, an anatomical condition which predisposes to the location of microbes. It has been shown that the small blood vessels in the medullary tissue are devoid of a proper vessel wall and appear more like channels than blood vessels, another condition in the make-up of the vessel which yields its influence in determining congestion and mural implantation of infected leucocytes under the action of an exciting cause. Tubercle bacilli as well as other germs inhabit the bodies of healthy individuals, but may not manifest their presence except under the influence of some disturbance of the circulation. This may be and very often is caused by an injury to a joint or bone which is considered trivial at the time, but which was just severe enough to cause congestion, slowing of the blood current, mural implantation of infected corpuscles, and the development of a tubercle.

The early diagnosis of this condition is the exception; and a diagnosis is usually not made until large cheesy foci are present—often broken down and perforating a neighboring joint; or if the primary disease is in the synovial membrane it is often completely destroyed before properly recognized.

An uniformly successful plan of treatment has not yet been devised, which is evidenced by the numerous methods in vogue. It is a well-known fact that large numbers of these cases which are operated upon never heal completely; the parts are often tunneled by one or more fistulous tracts, which become the seat of secondary infection and are a constant source of danger and annoyance to the patient. Some are persuaded to close after several operations, but others continue to discharge for years, despite all former modes of treatment. Another and even greater source of danger to the patient is the dissemination of tubercular matter during the operation for the relief of tubercular disease. Koenig first called the attention of the professor to this fact. Gerster says: "It is well known that death by general tuberculosis is seen to follow exsection of the

hip joint with especial frequency. Upon this circumstance is based the statistically proven fact that the expectant or rather non-operative treatment of this complaint yields better results than an active operative therapy. These facts find a ready explanation in the circumstance under which most early exsections of the hip joint are carried out. The depth of the diseased joint; the difficulty of liberating the head of the femur, still held down firmly by undestroyed ligaments; the desire of operating subperiostally, that is, with the employment of a good deal of blunt force; the forcible manipulations in distending the edges of the deep wound by retractors, all serve to propel any freed caseous matter into the cut orifices of veins and lymphatics. The result is that, by the time the local tuberculosis combated by the surgeon is healed, the patient succumbs to meningeal or pulmonary tuberculosis, probably chargeable to operative interference."

Iodoform emulsion in olive oil has been extensively used, especially by Dr. Senn. It is only useful in one class of cases; that is where no secondary infection with pus microbes has taken place. To be efficacious it should be used in the absence of oxygen, in the joints, abdomen, or tendon sheaths, by means of a trocar. If it is to be used after extensive operation on tubercular parts we must be certain of the sterility of the parts, and the wound should be tightly closed by means of sutures, making it practically subcutaneous. A large proportion of such cases, however, can not be successfully treated with iodoform.

From my experience with the use of the antitubercle serum of Paquin during the last seven months, I am confident that a great advance has been made in this department of surgery. The report of cases of pulmonary tuberculosis treated with Paquin's serum have been published elsewhere, and I wish to mention a couple of surgical cases which are quite interesting.

Mrs. M., age 25 years, the mother of two children, youngest six weeks old; has been troubled with tuberculosis of the right knee-joint for more than a year. She also has beginning pulmonary tuberculosis.

Two months ago I made an exsection of the joint. I found a cheesy tubercular focus in each condyle of the femur and two foci in the head of the tibia. The capsule of the joint was gelatinous and the cavity contained large num-

bers of the so-called rice bodies. The case in fact looked so unpromising that a thigh amputation would have been the proper treatment had I not intended to use the serum. A large rubber drainage tube was inserted, the wound closed and the usual dressings applied. One week later the first dressing, tube and sutures were removed. Since that time the wound has been perfectly dry and has not required redressing. The patient has been entirely free from pain ever since the operation and has slept well every night; her appetite is good and she has improved greatly in general health. Patient has been given 30 drops of serum daily since the operation.

Another case is that of a young man, aged 18 years, who had coxitis of the right hip eight years ago. He has ankylosis of the joint and several fistulous tracts running through the thigh. He has a tubercular abscess of the left tibia, one of the sternum and has had two abscesses of the lower jaw. He also has a tubercular nodule in the skin of the scrotum and an abscess near the apex of the left scapula. He has undergone nine operations on different parts of his body during the last eight years. Four of these abscesses were still discharging a characteristic tubercular pus when he was sent to me by Dr. Broome four weeks ago. He had had daily injections of serum in doses of 20 to 30 drops. One abscess has closed and the discharge from the others is now about one-fifth as much as before the beginning of the treatment. The progress of these cases should convince the most sceptical of the efficacy of the serum. I have made numerous microscopical examinations of tubercular products during the treatment with serum and have invariably found the bacilli decreasing in numbers. I have also found disintegrated tubercle bacilli which undoubtedly resulted from the specific action of the serum. The specific action of the serum is due to the nuclein which it contains; but this will form the title of a paper to be published shortly.

4403 Washington Avenue.

Rectal Injections of Serum.

The Paquin Anti-tubercle Serum is now used per rectum, thus affording safe, continuous treatment to patients refractory to hypodermic medication. An ordinary small syringe is used for the purpose.

[Reprint from the *New York Medical Journal*,
January 4, 1896.]

A Limited Experience with the Paul Paquin Anti-Tubercle Serum.

BY L. L. SHROPSHIRE, M.D.

SAN ANTONIO, TEXAS.

At the earnest solicitation of the husband of a patient who is in the last stages of pulmonary phthisis (upper lobes of both lungs destroyed), I began the use of the Paul Paquin antitubercle serum with her about July 1st last. I used it under protest, for I had already advised her husband to take her to her home in Alabama, where she could spend the last few weeks of her miserable existence among friends, with home comforts, for I was sure she had but a short time to live. Greatly to my surprise, after using the treatment a few weeks, she manifested marked signs of improvement. Night sweats disappeared, rigors ceased, and the temperature was much lower, at times normal for many hours. The treatment was continued two months, when circumstances took her beyond my reach; but I understand she is still living, with prospects of holding on for some time. She certainly would have died ere this had the serum treatment not benefited her so materially. As before stated, I administered the treatment under protest, realizing that it was absolutely impossible for anything to afford her any permanent relief; but, while trying the experiment with her, I decided to try other cases which would do more justice to the treatment. And let me say here that one does injustice to the patient, to the treatment, and to himself if he ceases the treatment and condemns it because the patient does not begin to improve at once, for my experience teaches me that some patients shown no signs of improvement under eight or ten weeks, while others improve very rapidly.

CASE II.—C. E. W., of Illinois, aged twenty-five years, appeared July 16th with the following history: In June, 1894, he was taken with a cough and hemorrhages from the left lung, followed by fever, purulent expectoration, loss of weight, and general declining health. He was sent to this city in September following to try the benefits of this wonderful climate. The climate was all that he could expect, and his health improved very materially, fever and hemorrhages ceased, and he

regained some of his lost weight. In May of this year he accepted a position as brakeman on a railroad running two hundred miles east into a malarial district, when he soon began to lose all he had gained, and all the former symptoms returned with increased vigor. The physical examination revealed dullness over the upper lobe of the left lung, moist rales and gurgling sound of a large cavity, violent cough, and temperature 103 degrees F. He stated that he had night sweats every night, could retain no food, and was losing flesh rapidly, weighing at the time one hundred and thirty-five pounds. Microscopical examination of the sputum showed a large number of bacilli. I began by injecting ten minims, and increasing five minims daily until the dose reached twenty-five minims. In two or three weeks the temperature and night sweats grew less, appetite returned, and digestion improved. From this time his improvement has been uninterrupted, until now, four months from beginning the treatment, he is practically a well man, and for the past month has been braking on a freight train, still increasing in weight and strength. Repeated examination of the sputum revealed fewer bacilli each time, until at the last examination, three weeks ago, but one single rod could be found out of four slides mounted. He now weighs one hundred and fifty-eight pounds, which is three pounds greater than the maximum weight of his life. I am continuing the treatment at such intervals as he is able to present himself, and expect at the next microscopical examination to find that the bacilli have entirely disappeared.

CASE III.—C. A., aged fifty-one years, shoemaker; has lived in this city many years, and contracted the disease here. He had la grippe a year ago, and has never been well since. Physical signs revealed nothing but a chronic bronchitis, which without the microscope could not have been pronounced tuberculous. While this patient was in the early stages of the disease he had begun to decline very rapidly.

He had no night sweats, and but slight fever every day, but he had no appetite and was losing flesh rapidly, weighing at the time one hundred and thirty-one pounds. He has now, after four months' treatment, returned to his work, having gained eighteen pounds, being one pound heavier than ever be-

fore, and the last examination of the sputum showed only three rods out of four slides mounted.

CASE IV.—Miss H., aged twenty years. Large cavity in left apex, high fever, excessive cough, and all prominent evidences of a rapid decline. No fever after four weeks' treatment, appetite ravenous, and has gained nine pounds in ten weeks' treatment.

CASE V.—T. E. M., aged thirty-three years. Disease of six months' duration. Both apices involved; night sweats, rigors, and high fever; no appetite, poor digestion, and losing weight rapidly. After six weeks' treatment has gained twelve pounds; night sweats, rigors, and fever ceased; appetite and digestion good; and he is the happiest man in the world, so he says.

Of twenty-five patients treated up to the present time all have improved, some very materially and others not so much. One patient remarked that he had been from Maine to Mexico, tried all the climates and many doctors and medicines, but this is the first thing that ever made him feel one whit better, and he intends to stick to it as long as it makes him feel well, whether it cures him or not. With the present light before us, who could refuse to try this treatment if it offers one ray of hope to the poor consumptive? What before has ever benefited those patients except climatological influences? With a life-long experience in this wonderful climate of southwestern Texas (which I believe is the best on earth), my efforts to relieve these patients have been signal failures so far as any medicinal remedies are concerned, and for the past few years I have refused to treat them, because I was compelled to acknowledge my inability to cope with this dreadful malady.

With the success reported by Dr. Paquin, Dr. Lemen and Dr. Simpson, of St. Louis, and many other prominent men throughout the country, in damp, cold, and unfavorable climates, why should we not expect better results from the serum treatment in a climate such as we have in Southwestern Texas?

San Antonio is situated near the center of what is called the dry belt of Texas. Her climate, although almost unknown to the outside world, is far superior to that of the much-advertised health resorts of the United States. With an altitude of six hundred and fifty feet above the sea level, an annual precipitation of 31.32 inches, a relative humidity of sixty-eight degrees, and a mean annual tempera-

ture of 65 degrees, with a yearly relative humidity of sixty-one per cent., she is the health-seeker's Mecca.

Many of the most prosperous business men of this little city of 60,000 inhabitants are men who came here ten, fifteen or twenty years ago, suffering with phthisis in its various stages, and are now living monuments of the great curative properties of this wonderful climate. A large sanitarium here, in conjunction with the Paquin treatment for tuberculosis, would be a blessing to suffering humanity.

[From the *British Medical Journal*, Aug. 17, 1895.]

The Serum Treatment of Tuberculosis.

BY PROF. E. MARAGLIANO,
GENOA.

The communication on the serum treatment of tuberculosis presented by Professor E. Maragliano, of Genoa, to the Section of Medicine has excited so much interest that we think it well to publish a full abstract of it here.

After alluding to the curability of tuberculosis as proved by the evidence of the post-mortem room, and after referring briefly to the endeavors of Richet and Héricourt in France, of Babès in Hungary, and of Paquin in America, to discover an antituberculous vaccine, he submitted his own researches which had been pursued for three years.

Professor Maragliano said that he had tried the serum clinically in eighty-two cases, including all forms of pulmonary tuberculosis, from the gravest to the slightest, and had arrived at the following conclusions:

1. Cases in which there are circumscribed foci of disease without any great degree of fever, and without any great admixture of other micro-organisms (diplococci, streptococci), are commonly benefited. He has used the serum in forty-five such cases, and all of those (twenty-nine in number), in which the treatment was carried out systematically might be looked upon as cured. The remaining sixteen improved greatly, but at the date of the report they were still under treatment, or, believing themselves to be cured, had declined to continue it.

2. Cases in which there are diffuse foci of tuberculous broncho-pneumonia, but without any considerable association of other microbes, even if moder-

ately febrile, are benefited in some degree, occasionally to such an extent as to give grounds for hope that, by perseverance with the treatment, a complete cure may be effected. Of fourteen such cases treated, all were improved, some to a marked degree.

3. Cases of diffuse broncho-pneumonia, with considerable association of other micro-organisms, are not appreciably benefited by the serum treatment alone. Of fourteen such cases under treatment, however, none got worse, and some even gained a little.

4. Cases of destructive broncho-pneumonia with cavities derive some slight benefit from the treatment. Of nine such cases, three showed some improvement (reduction of temperature and increase of weight); four others were very slightly benefited, and in two the disease was not checked, but ran on to a fatal issue. The improvement, according to Professor Maragliano, is lasting, provided the treatment be continued as long as is necessary to bring about a cure. In some of his cases the cure has been maintained for two years; in others, in which the treatment has been abandoned prematurely, relapse has occurred. The mechanism of the curative action of the serum is believed by the author to be that, by means of it, defensive materials are introduced into the organism, where they lead to the production of others. He deprecates any exaggerated expectations in advanced stages of the disease when there exist profound lesions of tissues, and he emphatically declares that "antituberculous serotherapy can be of use, and reasonably be expected to effect a cure, only in those cases of pulmonary tuberculosis in which no destructive foci exist."

The duration of the disease is a secondary matter. The important points are the extent, intensity, and nature of the pulmonary lesions. Another point of great moment, as regards the result of treatment, is whether one has to do with simple tuberculous infection or with a mixed infection. The association of diplococci and streptococci, with the bacilli of tuberculosis, retards or altogether neutralizes the effect of the treatment. Haemoptysis is not a contraindication, and indeed Professor Maragliano does not admit any contradiction whatever; he insists that the treatment is applicable in all forms of pulmonary tuberculosis. It is never injurious, and nearly always does good.

As regards the prophylactic value of the remedy, he has not yet been able to

come to a definite decision, but he seems to be inclined to be hopeful on this point.

As regards the technique of the injections, a situation in which the subcutaneous connective tissue is loose should be chosen; the site which he prefers is the posterior axillary line towards the base of the thorax. Of course, the most scrupulous aseptic and antiseptic precautions must be observed. The injections do not cause pain, and as a rule are not followed by local reaction; in a few cases, however, there was some redness, swelling, and pain at the site of the injection, occasionally with slight rise of temperature. All these phenomena disappeared in two or three days.

In cases in which there is no pyrexia, Professor Maragliano begins by injecting 1 centimeter on alternate days for ten days; then he injects 1 centimeter every day for ten days; finally two injections of the same quantity are given daily for ten days. When there is no pyrexia, an attempt should be made to subdue it by high doses, and 10 centimeters should be given at once. If the temperature does not rise again, after three days a daily injection of 1 to 2 centimeters should be given; if, however, the fever persists, a second injection of 10 centimeters should be given eight days after the first. The beneficial effects of the treatment show themselves sometimes within a fortnight, sometimes not until after a couple of months. Even when cure seems to be complete, the treatment should be continued for at least a month; and Professor Maragliano thinks it would be as well by way of precaution to give a weekly injection of 1 centimeter for at least a year. General hygienic treatment (climate, nourishing food, and particularly careful attention to the efficiency of the digestive apparatus) must on no account be neglected. Of the manner in which the antituberculous treatment just described may be combined with the treatment of accessory injections Professor Maragliano proposes to speak in a future communication.

Rectal Injections of Anti-Toxines.

It has been asserted by some practitioner that diluted anti-toxines are rapidly absorbed by the rectum, and can, therefore, be administered in the lower bowel with an ordinary small glass or rubber syringe.

Second Report of Cases of Tuberculosis Treated with Serum. Fourteen Recoveries.*

BY PAUL PAQUIN, M.D.

In the following report of cases treated in the last 18 months, exclusively by the use of serum, I mention partial improvements and failures, as well as recoveries under the head of acute and chronic forms of pulmonary, laryngeal, and glandular tuberculosis. In considering this report one should take into account the stake of the disease. Results must vary according to the nature of the disease; its complications, its infiltrations, its fever. Keep in mind whether the last stage had been reached with such conditions as cavities or contractions of the lungs or other pathologic phenomena demonstrating beyond a doubt that the malady had been in existence a long time or to a very serious degree, and altered the tissues affected beyond repair, or had produced irremedial constitutional changes.

ACUTE TUBERCULOSIS.

Miss V. Z., (East St. Louis, Ill.); physician in charge, Dr. J. L. Wiggins, East St. Louis, Ill.; two consultants, of St. Louis, Mo.

Miss V. Z. had been ill several months, and the last weeks, previous to consultation, she had been prostrated in bed with a complete history of acute pulmonary tuberculosis. The range of temperature was between 103 and 104 continually for many weeks prior to treatment. The one microscopical analysis made by us demonstrated bacilli of tuberculosis. Each physician consulted, diagnosed acute tuberculosis. Every ordinary method of treatment was pursued and the fever remained at 104, and even reached 105, with the various usual symptoms of delirium, etc. On auscultation and percussion, it was found that the lungs were both largely involved, and pneumonia was very extensive in one. Dyspnoea was excessively pronounced, weakness extreme; prognosis fatal. Everything having failed, it was decided, after consultation between Drs. Wiggins of East St. Louis and Lemen of St. Louis to try the serum which I produce. The treatment began, I think, on the 9th day of June, 1895.

*Presented to the St. Louis Medical Society, March, 1896.

The dose ranged between 20 to 40 ms. daily, and continued some six weeks, more or less regularly. The result was that the temperature decreased gradually and steadily after seven days' treatment to normal temperature, which was reached on the 22d of June, or 13 days after the first injection. Injections were continued until the end of July. The patient gradually and rapidly picked up, gained strength and flesh, and is again at work. Her occupation previous to her illness was that of an actress. Since then she has been engaged in various pursuits in a clerical way, and is said to be healthier than before. She weighs 132 pounds, whereas she was emaciated to at least 80 pounds before treatment. The germs of tuberculosis have disappeared entirely, and every symptom of lung trouble is absent.

R. C. G. (St. Louis, Mo.), aged 60; Dr. Lloyd Simpson was in charge. Three consultants; diagnosis of all was, I understand, acute tuberculosis, or tuberculous pneumonia, which was evidenced by pneumonia with almost complete infiltration of the left lung and extensive infiltration of the right. I saw the patient several times and am sure of the correctness of diagnosis. The patient, at the beginning of the treatment, weighed between 150 and 160. Serum was continued three months, more or less regularly every day, after which it was administered irregularly for about two months. This patient suffered, before the beginning of treatment, with imperfect kidney secretion and had to be injected with care, accordingly. The microscopical analysis of the sputum was made by Dr. Ravold, Bacteriologist of the St. Louis Medical College; Dr. Geo. W. Cale, of the Woman's Medical College, and my brother and myself, at the St. Louis Sanitarium before and at the beginning and during the course of the treatment, and in every instance, until after some weeks of treatment, the bacilli of tuberculosis were found in quantities more or less profuse. The patient received injections of serum almost daily in doses varying from 10 to 40 ms. for about three months, and irregularly thereafter for a month or more. At the end of three months no bacilli were to be found in the sputum and repeated analyses made by the same analysts failed to reveal them, I have been informed. The patient, who was at the beginning of treatment in bed, picked up in flesh rapidly, and at

the last date upon which I saw him, in the month of December, weighed over 200 pounds. He is now traveling, visiting his children and reports splendid health. There remains, however, in this case, a pleuritic adhesion on the left side with a probably permanent lesion, possibly of a fibrous character in the lower lobe of the same lung. This patient exhibited before and during treatment, and does yet exhibit, to a slight degree, symptoms of asthma. He had returned to work and is able to attend to his duties as real estate broker and feels safe and happy.

Mrs. F. (San Antonio, Texas), practically the same kind and nature of a case as Miss V., the first patient reported above, and the results were the same. The patient recovered in a few weeks.

These are the only three true acute cases without complication that have been treated with the serum, to my knowledge, all three responding alike and are well to-day.

CHRONIC TUBERCULOSIS.

It is obvious that it is exceedingly difficult to establish an arbitrary line between the first and second stages, and between the second and third stages, of pulmonary tuberculosis. Whoever may hear or read me, may, for convenience sake, include in the first stage all those whose conditions have not broken down the tissues or produced a marked constitutional depression or general infection consequent on local lesions. This does not include incipient tuberculosis, which is earlier still, and is seldom brought to the physician, and far less the pre-tubercular conditions. A large number of cases in the second are very grave, whilst most of the third stage, and all of the fourth perhaps, may be classed as hopeless, many of the latter being practically moribund when treatment is sought.

Mrs. H. R. (St. Louis, Mo.), consulted me in February, 1895. Her history was that she had had slight hemorrhages, had been ill for two years, had coughed and was coughing very severely, and had expectorated previously a muco-purulent material, occasionally tinged with blood. The sputum at the time was profuse—full of bacilli of tuberculosis and largely loaded with different forms of pus germs. Her attending physicians kindly acquiesced in her desire to try the serum. Mrs. R., at the beginning of

treatment, evidenced infiltration in the apex of the right lung between the third and fifth rib, covering an area of about 4 inches laterally, and penetrating the lung more or less through and through from anterior to posterior. There was softening and there were mucous rales about the middle of this area, very pronounced, and interrupted breathing on both sides. The circulation was exceedingly rapid and fever ranged usually from 99 to 101.2-5—rarely it went above that. The patient had night sweats, had lost much flesh, being reduced to the weight of 90 pounds. During the first two or three months of her treatment there was illness in her mother's family, in which a brother died of tuberculosis, and illness in her own family, one of her own children being confined to its bed several weeks, all of which conditions precluded Mrs. R. from getting sufficient rest and peace and nourishment, and which forced her to an excessive amount of worry, annoyance and labor. Notwithstanding this, however, on the regular dose of 30 ms. a day for three or four months, and then irregularly every third or fourth day, with a loss of three weeks at one time, covering a period of six months, all told, Mrs. R. improved in flesh to the weight of 132 pounds, and became strong accordingly, developed a splendid appetite, and for the last three months her sputum, which is exceedingly scarce now, and comes only when she is affected by cold, exhibits no bacilli of tuberculosis. She suffered a miscarriage and six weeks' illness recently, but her lungs remain sound. The physical lung symptoms which existed at the beginning have disappeared, and the patient has recovered.

Mr. E. D. (St. Louis, Mo.), age 36; occupation, shipping clerk; history of glandular tuberculosis dating back 11 years. Had pneumonia four years previous to his examination in my office, May 16, 1895. Had been declining six months, had had night sweats and fever, pain in left lung, back and front; pulse 108 at time of examination; temperature ranged from 99.3-5 to 101; coughed chiefly in the morning; expectorated a yellowish matter; slept fairly on the right, but could not sleep on the left side because of pain in the chest; was too weak to attend to his duties. There was marked dullness in the left lower lobe, and crepitus of the left apex over a lateral area of four inches, extending three inches downward. There was interrupted breathing, both

sides. All these symptoms disappeared almost entirely in four months of treatment, consisting of 15 to 30 ms. of serum a day. Examination of the sputum made since revealed no bacilli. Mr. D. is at work from 12 to 15 hours a day, Sunday included; feels strong and in good health. He has recovered.

Mr. S. (St. Louis, Mo.) came to me to be examined in February, 1895. He weighed about 145 pounds at the time. Had had very profuse hemorrhages at Hot Springs, where he had been sent; had lost about 60 pounds from his regular weight, which was above normal for his size; was coughing a great deal night and day; expectorated a thick, yellowish matter loaded with bacilli of tuberculosis, and other microbes, and was rapidly declining and weakening. He was unable to perform any of his duties as a groceryman. His physical condition evidenced tuberculous affection of both lungs, particularly in the right, over the whole of which interrupted breathing was very plainly perceptible, with loud rumbling. The lower half of the lung exhibited moist rales. The left was slightly involved in the same manner. These symptoms, after seven months of more or less regular daily treatment, which consisted of 20 ms. in the beginning, and was increased to 30 and 40, and once in a while to 60 ms., almost entirely disappeared, with the exception of a slight interrupted breathing. Flesh was regained to the amount of 170 pounds, and strength seems now to be as good as ever. Mr. S. is now, and has been for the last four months, attending to his usual duties, working hard every day, and complains of nothing. He expresses the opinion that he is free from disease. In this case there was a cavity formed, and expectoration has not entirely disappeared, and yet his condition of health is marvelously improved. His condition has been evidently subjugated by the serum, and is held at bay.

Mr. F. B. M. (St. Louis, Mo.), age 20; occupation, railroad clerk, working at night; had had bronchitis at the age of 14; had suffered from night emissions from early puberty. Previous health, feeble; cough, scarce; pain in the lower lobe of the left lung; temperature 99 to 100. Physical examination evidenced dullness of the lower lobe, beginning at a line drawn below the nipple and extending down towards the base. Microscopical examination revealed the bacilli of tuberculosis, not in large num-

bers. Mr. M. was treated from May 27, 1895, to the middle of September, practically four months. All physical symptoms and evidences of tuberculosis have disappeared. He is now at work as before, and in good health. No bacilli have been found in the examinations made since.

Mr. G. N. F. (St. Louis, Mo.), examined April 29, 1895; age 45. Occupation, book-binder. Has had a dry, hacking cough two years; had had pneumonia at age of 18; congestion of lungs two years previous to his examination. February 7, 1895, he had hemorrhages which dragged him to bed, and at the beginning of treatment he weighed 130 pounds; expectoration thick and yellowish; bacilli of tuberculosis numerous. Temperature 99.3-5 to 101; infiltration of the left apex below second rib about 3 inches downwards, and four inches across, evidenced both anteriorly and posteriorly; dullness over same region; crepitus below left breast anteriorly. Mr. F. was treated with tubercle antitoxine from the beginning of May until the beginning of October almost every day, at the dose of 30 to 40 ms. Since then several examinations have been made, and no germs of consumption are to be found. On the other hand, physical symptoms had at the time of my last examination practically all disappeared, and there is little, if any, expectoration whatever. The patient had resumed his work and considers himself cured, and I consider his disease arrested. He weighs to-day 140 pounds, which is more than his normal weight before his illness. He has been attending to his usual duties for several months.

Miss S. (Nashville, Tenn.) was admitted to the Sanitarium in May, 1895, and remained under treatment some three months. She came with a written diagnosis of pulmonary tuberculosis from her family physician, which was substantiated by microscopic and physical examination. The bacilli of tuberculosis were found in large numbers, and the patient was rapidly losing ground, both in weight and strength, coughing considerably, particularly at night, and expectorated occasionally a yellowish matter, and sometimes a greenish matter. Night sweats had existed, and fever ranged from 99 to 102. She was treated with serum at doses ranging from 20 to 35 ms. After three months she had gained ten pounds. She then migrated to Las

Vegas, N. M., where she continued the treatment under Dr. Shaw, of the Santa Fe R. R. Hospital there, and her improvement continued. She at first lost flesh, but again increased, and every vestige of symptoms seems to have disappeared, if I may judge from the reports sent me. The bacilli and all physical signs of lung disease have disappeared. Bacilli have not been present for over two months. The disease in Miss S. is considered arrested, I judge, by her attending physician, and she considers herself cured.

Miss G. A. (St. Louis, Mo.), age 19 years. Occupation, music and vocal student; had had influenza in Memphis six years before; dry hacking cough for a year; weighed 123 pounds; hemorrhages four years previous to examination. September 26, 1895; larynx infiltrated; temperature 99½ to 101; coughing considerable, and expectoration in the morning of yellowish matter; bacilli of tuberculosis quite numerous; heart disease evidenced by regurgitation. Treatment began the last day of September, 1895. Injected very small doses on account of her heart condition; that is, 10 to 25 ms. daily. At this time Miss A. weighs 130 pounds. The bacilli of tuberculosis are seldom present in her weekly examination, and when they appear they are very scarce, there being one or two in the field once in a while. Cough has almost entirely disappeared. Strength has been regained, and appetite is splendid. This patient is considered as having almost recovered, as there exists no longer the physical signs of infiltration, and the first signs of breaking down, which existed at the beginning of the treatment, and the bacilli have disappeared.

Mrs. X. (Chicago, Ill.), age 33, married; has a family of six or seven children; began treatment at the Sanitarium May 19, 1895, and continued at the institution under the treatment for a period of two months, after which she went away, and later reported as being free from disease. Her expectoration having ceased and cough being nil. This patient had been ill two years; had had pneumonia, following an operation for hemorrhoids. Having had no opportunity of making an examination since this report, I am unable to verify it with personal data.

Mr. V. (employed at our institution), age —, a patient under the charge of Dr. L., had laryngeal and pulmonary

tuberculosis. His condition had been declared, in writing, hopeless by a number of specialists of St. Louis, including all the leading ones. He has been treated under the special care of Dr. L. for a period of about ten months, having received from 30 to 120 ms. a day. At the beginning of his treatment there existed infiltration and other lesions of the larynx. He had lost his voice, weight and strength. He was in a hospital, unable to perform any work. He is now assisting in the care of some twenty-two horses in company with another man, working many hours every day in water and dust, and his appetite has improved and his strength keeps good. He is sensitive and susceptible to colds, but under the treatment with serum he has gained a condition which permits him to do all the menial labor that can be asked of almost any man. Rarely have we found bacilli in the scant expectoration of the last four months. I am unable to say more of this case, because of the fact that he is not my patient. I report him because he is under my supervision, and the injections are done by my assistants or myself.

Mrs. A. C., age 26, married, has had three children and two miscarriages, one recently. At the age of 14 she received a kick in the chest, at which point pain appeared frequently, and whenever the patient contracted cold. At her examination, infiltration was discovered over an area of about three inches in diameter on the right side below the breast, also dullness in the left lung between the second and third ribs, extending about two inches downward and two inches laterally. She had had the various symptoms of tuberculosis for some years, and dated the accidental incipency of it fourteen years previous, when she had received this kick at a spot where the consolidation occurred. She has had several hemorrhages. The active development of the disease dated three years previous to my examination, which occurred June 7, 1895. At that time she weighed 115 pounds; to-day she weighs 135 pounds. She had dyspnoea, expectorated a great deal, coughed, almost unceasingly, had a very poor appetite. Now all these symptoms have disappeared, and her strength has increased so that she is able to perform her daily duties. She comes to my office almost daily, and expresses herself as improving continually. The physical signs

above mentioned have disappeared almost totally. Bacilli of tuberculosis in the last three months have been found but once in very small numbers.

SURGICAL TUBERCULOSIS.

B. McG., age 18 years 2 months, had been suffering with joint and bone tuberculosis for seven years, and had had ten operations performed on different parts of his body to open abscesses and to remove necrosed bone. The seat of the trouble was the right hip joint, but it was giving him trouble on every limb. The left tibia was much involved, having at one time eight openings discharging a tubercular pus. The hip had three openings that would heal and open alternately, and one that was open continually for seven years. He had an abscess on each arm, one of the sternum, one of the index finger of the right hand, a tubercular nodule in the skin of the scrotum, an abscess near the apex of the left scapula, and two on the lower jaw. After the continued efforts of Dr. J., of Waverly, Ky., who had for consultants two physicians of the same State, to cure the patient had failed, it was decided to let nature take its course. He was without medical aid for two years. In the fall of 1894 he was put in care of Dr. Broome, St. Louis, who performed an operation to remove necrosed bone from the thigh, thinking these openings would heal. This having failed, he decided to try the serum treatment, and was taken in charge by Dr. Cale, St. Louis, Mo. He began the treatment in March, 1895, at which time he had four abscesses discharging a characteristic tubercular pus, and two places that afterwards opened. He had daily injections of serum in doses of 20 to 30 ms., and at the close of six months' treatment five of these abscesses had closed, he had gained ten pounds, and was without temperature. He is working steadily, and is still gaining weight. The last and only opening is on the thigh, and dead bone has been located, which is the cause of its remaining open. Up to the present date he has gained sixteen pounds, has a good appetite, and is enjoying good general health.

I may add to this report of good results of cases of which I have more or less direct knowledge:

Mr. K., pulmonary tuberculosis eight years; surely in last stage of disease; cavity in one lung; contractions

of and infiltrations in both lungs. Had been injected in vain nine months with Koch's tuberculine; gained over twelve pounds with serum, and all symptoms have so improved that he has returned to his work, in part, as insurance solicitor. He was treated eight months almost daily.

Miss H., stenographer, had been invalid two years; disease in second stage; regained ten pounds and about normal strength in four months, and to-day seems to be on the high road to recovery.

Mr. M., grain dealer on change, disease in third stage; increased eight pounds and in strength, and is enabled to keep to his arduous work by continual treatment.

Mr. W., printer; in the second stage; increased over ten pounds, and exhibits no bacilli, and has exhibited none for three months; disease arrested.

Mr. O., stationary engineer, was ill several years; exposed to alternating heat and cold; disease in the third stage; treated seven months; regained his strength sufficiently to keep up his arduous duties, which he must have abandoned long ago.

Of the twenty-two City Hospital cases reported a year ago, I have been able to keep track of but two. One with a cavity, extensive infiltrations, adhesions, displaced heart, was raised from bed, increased thirteen pounds, and returned to work in six months during the exclusive use of serum. He then died suddenly at the City Hospital after a liquor debauch, and I did not have the opportunity to see the post-mortem examination.

The other, a case of over three years, Mr. H., with advanced tuberculosis, was likewise raised from a bed of sickness over a year ago, and has almost ever since been working as stable man, and seems to be fairly healthy and strong to-day.

Nearly all the desperate cases with cavities, with a history of long standing tuberculosis, are likely to succumb. It is usually in the last stage that patients submit to new treatments for consumption, and it is often in the same stage that doctors are willing to try new remedies of this character. The large number of unfortunates in the third stage (with contracted lungs, cavities, hopeless infiltrations, general infection, etc., etc.), who grasp at this treatment as a last resort, cannot

be expected to recover, although some of them do improve, and in a few the disease seems to be arrested. In my practice I do all in my power to prevent hopeless cases from using the serum, although it is not unfair to try and prolong their life with it, if, at their own request, they so desire.

The injustice of discrediting the value of serum on the results obtained in such cases is obvious to any unprejudiced and fair-minded man.

In conclusion, I will state that of one hundred cases of pulmonary tuberculosis treated from three to eight months, during a period of eighteen months, the following results have been obtained:

In the first and early second stages, recovered 14

This is the total number treated by me in this stage, and all seem to have recovered.

In the second stage, improved and in statu quo, or still improving or checked 26

Among these 26, fully 12 seem to have recovered, if absence of former symptoms and recovery of flesh, strength and cheerfulness indicate anything.

Disappeared from observation, in all stages 35

Died during treatment, begun at the third and fourth stages, including ten (10) practically moribunds, who insisted on trying the treatment ... 25

Total 100

Report of Four Cases of Consumption Treated with Paquin's Serum. Recoveries.

BY A. M. HAYDEN, M.D.

Chief Surgeon St. Mary's Hospital, Evansville, Indiana.

My first case was one with large cavities in left lung, hepatization of the lower portion of right lung; had a great many hemorrhages; sputum contained large quantities of bacilli; weight 120 pounds. Treatment commenced May 10th, 1895. In three months tubercular bacilli disappeared from sputum entirely, and it has remained free from them ever since. The cavities in left lung healed up, with great contraction of the left chest, three or four inches. It has remained so. The patient ceased to expectorate heavy sputum, and now expectorates a light frothy sputum. Has had no hemorrhages since treatment began; he has weighed

140 pounds for the last six months; ridden a bicycle; eats well, and commences his duties as assessor to-morrow. After the first three months, I gave him one to two ounces only at intervals of one and two months. I am satisfied that he would have been dead long before this had he not had the serum.

CASE II.—A young man, 25 years old. Family history was that of tuberculosis. His sputum contained quantities of tubercular bacilli; weighed 110 pounds; had been West without benefit; had night sweats, fever and all symptoms of the dread disease. I commenced his treatment September 8, 1895. I gave him 56 daily injections of 35 ms. each. Tubercular bacilli disappeared from sputum; gained 10 pounds. January 20th I commenced and gave him 16 more injections, during which time he gained 5 pounds, which is more than he ever weighed in his life. He is still in splendid health and says he is feeling better than he ever did in his life. To-day I advised him to take another ounce of serum to guard against relapse.

CASE III.—A young man with long standing hip-joint disease. I gave him an ounce in January, 1896, during which time he gained 16 pounds in flesh and general health much improved. He then stopped two weeks, during which time he ceased to gain flesh. He then commenced again and took one ounce more and gained 10 pounds. His health has been much improved since.

CASE IV.—A man, aged 40 years. Several brothers had died of tuberculosis; was taken sick in November with a cough, night sweats and fever. His family physician treated him until Jan., 1896, when I was called. He was much emaciated, no appetite, night sweats, fever, etc. While he coughed almost incessantly, he did not expectorate. I failed to find any lesions of the lungs in physical examination. His liver failed to act (chalky evacuation, etc.) His family physician had treated him faithfully without results, and he was satisfied that patient was suffering with tuberculosis of liver and other glands. I advised him to use serum, stating to patient that if his trouble was tuberculosis he would be benefited, if not cured. He consented and started the treatment. The improvement commenced at once. In 16 days he gained sufficient to get up and walk a square to a grocery and get weighed, and found that he weighed his usual weight, 150 pounds. We then stopped the treatment for 10 days. Patient requested me to begin again, saying that his appetite was not so good and that he was having night sweats again.

I ordered another ounce; had him weighed, and found he weighed 150 pounds still. I gave him one more ounce, which covered 16 days, and again had him weighed, and found he weighed 170 pounds, a gain of 20 pounds in 16 days. He is now at work and says the serum saved his life, and will not hear to anything else. After I commenced the treatment I stopped all other medication.

I have a case of laryngeal tuberculosis that has just finished her second ounce, of 32 days' treatment, and she has gained 1 pound; has a better color and says she feels much better; and Dr. Lehardy, a throat specialist, who has been examining her throat, says the ulcers on vocal cords are improved.

I have one lady patient with acute tuberculosis of lungs that has taken 2 ounces, 32 days' treatment; was benefited during the first two weeks, since which time she has lost, and at present her condition is not any better than when she commenced her treatment. However, she has a mixed infection.

I am also treating another lady that has pulmonary tuberculosis. She has taken 1½ ounces, 24 days' treatment. She is improving very rapidly, and I am satisfied that she will recover. All my cases have been diagnosed by presence of tubercular bacilli in the sputum, as well as by physical examination, except the one with tuberculosis of the liver. Diagnosis in that case was based on family history and physical signs, together with the fact that he went from bad to worse in spite of the best medical treatment.

I will stick to the serum treatment, at least until something better is found. It has proved much more satisfactory in my hands than any other therapeutic agent in tuberculosis.

Excerpts from the Reports of 65 Physicians who have Used Serum in Consumption.

Dr. L. L. Shropshire, San Antonio, Tex., under date of September 12, 1895, writes as follows: I am better pleased and more encouraged every day with my experience in sero-therapy. I am now treating thirteen cases, and all who have been treated any length of time are showing signs of improvement. I have one patient who has gained 17½ pounds in less than seven weeks' treatment. He is within 2½ pounds of his maximum weight, and says he is entirely well, and wants to

go to work on the railroad. This is the first time I have undertaken to treat a case of consumption in nearly three years. I have turned them away from my office by the dozen with the honest confession that I did not know what to do for them, as I thought it was like robbing the dead when I knew I could do them no good. My experiments here have created quite a sensation.

Dr. T. E. Taggart, Bakersfield, Cal., under date of September 11th, 1895, writes as follows: I have been testing the serum about three weeks. Now I must confess that it is all that is claimed for it; and I am going to ask you to send me two more bottles.

Dr. N. Matas, Tucson, Arizona, writes under date of September 13, 1895, as follows: I am now treating six cases with this serum, all desperate cases, and some are doing remarkably well.

Dr. Robert H. Babcock, Chicago, under date of June 8, 1895, says: Many thanks for the serum received this morning for Mrs. M. I am so much pleased with the results obtained in her case and Mr. G.'s, that I desire to try the treatment with two other patients.

Dr. R. E. Bering, Houston, Texas, writes under date of August 2, 1895: I am pleased to write that she has had no hemorrhages for ten days, when formerly she had two or three. She coughs but very little; has increased $1\frac{3}{4}$ pounds; temperature ranges below 100 degrees F.; former temperature, 103 $\frac{1}{2}$ degrees F.; night sweats have ceased, and a general improvement noted. This improvement is caused by using one ounce.

Dr. Geo. W. Boot, Spencer, Iowa, writes under date of June 26, 1895, as follows: I am pleased to report that the patient using the serum has gained 2 pounds within the last two weeks. She had previously for several weeks been losing a pound a week. This can be attributed to nothing but the serum, for she is taking no medicine except a sedative cough mixture, and very little of that. Hygienic and other influences just as they were when she was losing ground.

Dr. N. J. Beachly, of Lincoln, Neb., is using the serum upon himself. He simply writes, under date of August 26, 1895: I am improving. Under date of September 10, 1895, writes: I simply say that I have used it upon myself for nearly three months, and am alive, and

very much so. I am improving and continue to improve.

Dr. Louis W. Ehrlich, St. Louis, under date of March 4, 1895, says: Regarding the serum treatment, I want to say that the longer I use it the more am I convinced of its efficacy. When I see consumptives treated for over three months, and notice a slow but constant gain in weight, lessened cough, increased appetite, physical signs of phthisis disappearing, and several other improvements, I cannot but give a favorable opinion about the treatment.

Dr. S. L. Corbin, Warner, Washington County, Ohio., writes under date of July 2, 1895, as follows: The first half ounce came in good order. And in using it I saw no unfavorable results, but my patient claimed to feel great relief from the cough after the third day's use. Under date of July 17, 1895, Dr. Corbin says: I have no doubt but the serum would make him a well man. He began to gain rapidly in weight, from the use of only one ounce of the remedy. Again, writing under date of July 29, 1895, Dr. Corbin remarks: And I am confident we will make a cure, unless there is a change to the contrary. For the young man says he is gaining strength rapidly, and the people notice the change in him.

B. B. Grover, M. D., Colorado Springs, Colo., writing under dates of August, 24, 25 and 27, 1895, says: Mr. G., one of Dr. Paquin's patients, called on me yesterday. He is very enthusiastic over the treatment, and it gives me encouragement to go ahead. Yours from Santa Fe at hand, and note what you say in regard to my patient with urticaria. I stopped the injection for one week, when all signs of skin trouble disappeared, when I resumed treatment without further trouble so far. He has occasionally diarrhoea, which probably accounts for his not improving faster, but he is doing remarkably well—the bacilli have been reduced from four to the field to one in four fields, which I think is remarkable in so short a time. He is gaining flesh and feels well. I shall commence the treatment of case No. 2 to-day, which, by the way, is my wife. She is in the third stage of the disease, and if she improves in the least I shall be thankful. I can report progress with cases Nos. 1 and 2.

Dr. Robt. Hoffman, Baltimore, under date of July 15, 1895, writes: I have

given Mr. Geo. M., from July 1 beginning, every day one injection of your serum. The first dose m.x., but from the fifth day every day m.xxx. There has been almost no reaction on the temperature. Patient says the cough at night does not trouble him so much, and I myself think he looks better. There are many bacilli in the sputum, and right before I began your treatment patient had a very severe hemorrhage like often before—without any harm. I will continue the treatment. Under date of July 27, 1895: Mr. M. has received the twenty-seventh injection to-day (m. 45), and there is no doubt the cough is less, the expectoration is less; patient does feel better in general, especially mentally.

B. M. Hines, M. D., Gloster, Miss., under date of July 13, 1895, says: Find my cough is improved, and expectoration lessened since beginning its use.

H. N. Henderson, M. D., Lakeside, Hospital, Chicago, under date of August 17, 1895, writes: The patient that I am using it on is slowly improving. I think it has at least arrested the progress of the disease.

A. M. Hayden, M. D., Evansville, Ind., under date of July 26, 1895, writes as follows. Mr. F. A.'s condition is much improved since treatment as compared with condition prior to treatment. His case was unfavorable to commence with, the disease being far advanced. Left chest $2\frac{1}{2}$ inches less than right, with only $1\frac{1}{2}$ inches expansion. The tubercular bacilli having diminished in quantity in sputum under the treatment.

Dr. C. Impey, Omaha, writing under date of July 17, 1895, says: My patient expresses himself as feeling considerably improved.

Dr. J. O. Jenkins, Newport, Ky., writing under date of July 8, 1895, says: The serum last ordered came to hand in good condition, and have been using it since with satisfactory results.

Dr. J. T. Jackman, Chino, Cal., writing under date of August 21, 1895, says: I was greatly benefited by the treatment and want to continue it.

John T. Jones, M. D., New Orleans, La., under date of August 26, 1895, says: I now have two patients on the use of your serum. The first, a case of tuberculosis of upper portion of both lungs, has been receiving the remedy some three weeks. She seems to be doing remarkably well. In the first two weeks she gained five pounds in weight; all the rales have become soft;

there is very much less dullness at apices, and the affected areas give much fuller and freer respiratory sounds. She also says that she feels livelier, stronger and more able and willing to work than she has felt in some years. The only objectionable effect noticed in this case was some slight stiffness of many of the joints, which, however, was only a very trifling matter and passed away in the course of three or four days. The second case has been on the use of serum only five days, consequently I cannot say much as to its effect as yet. I am under the impression that very much the largest proportion, if not nearly all, of those who condemn the serum have never given it any sort of a trial and consequently must be considered a little hasty in their judgment.

W. G. Kibbe, M. D., Abbeville, La., under date of August 3, 1895, writes: I began using the serum on my son the 26th of July, giving one injection daily for five days, beginning with 10 minims, and increasing gradually to 25 m., as directed. He has had fever every day for months past. Temperature on rising in morning 99 degrees F., and by 10 a. m. 103 2-3 degrees, until 4 or 5 p. m., when it would decline. The first day of injection he missed his fever entirely, and has had no return since, now seven days.. Is feeling stronger and better and looks better. Has gained in weight about $1\frac{1}{2}$ pounds. I am much pleased with the result of the treatment. Under date of September 4, 1895, writes: I have great confidence in the treatment. Am treating several cases with decided benefit in only a few days. One of them had not been entirely free from fever for two years, and the fever was arrested after the third injection of serum, and she has had no fever since, and improving generally. In her own manner she explains to my satisfaction her great improvement.

Dr. H. S. Lewis, New Orleans, writing under date of June 25, 1895, says: My results with the serum treatment have been entirely satisfactory.

The following letter is from Dr. Lewis to the New Orleans "Times-Democrat":

New Orleans, July 2, 1895.
To the Editor of the "Times-Democrat":

A little over a month has elapsed since I first began the use of Dr. Paul Paquin's anti-tubercle serum in the treatment of consumption, and, as it

was by your request that I essayed this new treatment, I write to acquaint you with the results.

I am fully convinced that Dr. Paquin has at last discovered a cure for many cases of consumption. I write "many" advisedly—not all; for my brief experience with the serum leads me to believe that it can do very little good where large portions of lung tissue have been destroyed, and the poor sufferers are fighting to get a sufficient quantity of air with a deficient quantity of lung.

That the disease can be arrested in the earlier stages by the serum injections there is not the shadow of a doubt. I am fully convinced that our friend, Mr. Geo. Dauer, of your staff, has been cured.

He has not coughed for several weeks, the rales and other evidences of pulmonary consumption have disappeared, and the tubercular bone trouble of which I spoke to you is entirely cured. A gain of ten pounds in weight is another indication of this marked improvement.

Allow me to thank you for the happy thought which prompted you to urge me to adopt this new and potent line of treatment in tubercular diseases.

HAMPDEN S. LEWIS, M. D.

L. M. McLendon, M. D., Brewton, Ala., writing under date July 24, 1895, says: My patient is doing finely under the serum I ordered of you before this. And under date of August, 9, 1895, says: My patient (adult male) is improving.

Dr. E. L. McGehee, New Orleans, says, writing under date of June 17, 1895: It has had a wonderfully favorable result on a patient in the third stage of pulmonary tuberculosis. I am anxious to continue the treatment.

Prof. A. J. McClatchie, Pasadena, Cal., under date of June 16, 1895, says: You will see by the report that patient No. 1 has improved considerably since beginning treatment, and there is a greater improvement than such a record can show. He is much encouraged over his condition.

J. T. McAnally, M. D., Carbondale, Ill., writing under date of June 26, 1895, says: Have used all of the ounce of serum sent me on the 6th inst. with satisfactory results.

R. H. Wilkin, M. D., Marfa, Texas, writing under date of August 28, 1895, says: Have only one patient now taking the treatment, and he is doing nicely.

Dr. J. C. Westervelt, Shelbyville, Ill., writing under date of June 7, 1895, says: I believe it is a benefit to my patient.

T. J. Whitten, M. D., Nokomis, Ill., under date of July 3, 1895, says: The patient upon whom I am using it seems better.

Dr. E. W. Demaree, Manitou, Colo., writing under date of August 26, 1895, says: I feel sure, however, that the treatment has benefited me. Appetite and strength have improved somewhat; has lost weight a little, but is hardly, if at all, below normal now; amount of expectoration never very large, but has remained nearly constant; bacilli still present; cough, as such, not troublesome; area affected right apex only, or possibly a somewhat larger area under the right scapula, but not extending through to the anterior lung.

T. J. Wright, M. D., Fort Smith, Ark., writing under date of May 1, 1895, says: I have used the serum every day (but one) for a week. Not a single reaction has occurred yet. The patient is improving in appetite, has a better color, and during the last 24 hours no fever.

Dr. Olive Wilson, Fairmount, Ind., under date of August 20, 1895, says: My patient began to improve in a very few days after beginning the treatment. He had his first injection five weeks ago last Monday. At that time he was not able to walk three blocks without resting. He has now been at work (typesetting) two weeks. Says he never felt better in his life than last week.

Dr. T. P. Yerkes, Upper Alton, under date of May 18, 1895, says: My patient feels encouraged, and declares that he sleeps better, eats more, and coughs less than he has done for months.

D. A. Williams, M. D., Marion, Ind., writing under date of June 19, 1895, remarks: Patient has gained in weight 2½ pounds in one week; sleeps well; has a ravenous appetite, and I am hopeful of a permanent cure.

A. F. Moore, M. D., Polo, Ills., writing under date of July 1, 1895, says: I have used the ounce received a few days ago, and am highly pleased. Again, under date of July 30, 1895, he says: I am using your anti-tubercle serum on one of my patients who is suffering from phthisis—a large cavity in apex of right lung—and so far I am pleased with the results obtained.

Dr. C. E. Merriwether, Louisville, Ky., writing under date of July 12 and 29, 1895, says: My patient seems to be improving. I believe the serum will do the work. My patient is getting along finely. Under date of July 9: Patient No. 1 is in good shape, and will return to his trade as soon as present supply is out. Again, under date of July 26, 1895, Dr. Merriwether says: Patients doing well.

G. W. Prewett, M. D., Marshall, Ill., writing under date of July 16, 1895, says: I have used six injections of anti-tubercle serum, according to instructions. Following is the temperature each day's treatment: July 9, 102 degrees F.; July 10, 103½; July 11, 104; July 12, 101; July 13, 102; July 14, 101; July 15, 99.1; July 16, 98.3. The hemorrhage of bowels has ceased, sleeps good, appetite good, digestion improved, night sweats almost gone, and chills ceased.

W. A. Potter, M. D., Lancaster, Mo., writing under date of May 30, 1895, says: My results have been gratifying.

A. E. Powell, M. D., Marion, Ind., under date of June 26, 1895, writes: I find that I am beginning to gain slowly in weight, and I feel like a new man. My muscles are getting hard, and my fever is less than when I left St. Louis.

N. J. Phenix, M. D., Alvin, Texas, writing under date of July 12, 1895, says: I am now giving 40 m. per day to a patient in the third stage of consumption. He had been for some time losing nearly a pound per day. During the last week he has gained three pounds, and his symptoms indicate an improvement.

Dr. T. P. Singletary, Baton Rouge, La., writing under date of June 19, 1895, says: I am treating a case with the Paquin serum that I obtained from Dr. Lewis of New Orleans. The reports are extremely favorable thus far, and I am anxious to give it a thorough test.

J. J. Norwine, M. D., Bismarck, Mo., writing under date of May 23, 1895, says: My patients both say they feel better. I have not examined or weighed them since the first day of treatment. They are hungry all the time, and sleep very much better. In fact, they are looking better. I am using on the third-stage patient one syringe of morning and evening; in the first stage cases only mornings. Have not had the least bad effects in any way save they are "sleepy or drowsy" after treatment for a few hours.

John B. Rosson, M. D., Tulare City, Cal., writing under date of June 27, 1895, says: The patient I have been experimenting with seems to be already improving some. I have used only one-half ounce yet, and cough is better and fever less. No unpleasant effects, except eruptions and itching. Under date of July 2, 1895, he writes: Her temperature is about 100 degrees F. in the evening, and normal in the morning; whereas, before treatment with serum, it was 101 degrees F. morning and 102 and 103 degrees F. at evening. She has had fever for more than a year. She coughs less. She sleeps all night without coughing, and before the cough annoyed her much. Under date of July 18, 1895, he writes as follows: I have a patient who has had tuberculosis 3 years and was very weak. I am pleased to state that this patient (a man) increased 5 pounds in 7 days under Dr. Paquin's serum. Fever has gone down, appetite increased, and sexual desires—which had disappeared—have returned with vigor. It is an aphrodisiac of great power in my opinion. This patient's cough is much improved, and his face has a more healthy glow. It is most wonderful that the improvement comes on so soon after beginning the treatment. Again, writing under date of August 5, 1895, Dr. Rosson says: Patients are getting along well. An incipient (yet rapid) case we lately began treating is improving rapidly.

A. E. Owens, M. D., Princeton, Ill., writing under date of July 5, 1895, says: The report I make in the use of the one ounce is of a favorable character, even under very unfavorable circumstances. I hope for still better results from now on.

Dr. A. J. Schweichler, Milwaukee, Wis., writes under date of May 3, 1895, as follows: I am treating a young girl of 19 and a married lady of 22 years with your serum. I inject only 20 to 21 minims daily. The girl has a daily fever ranging from 100 to 101 degrees F., but it is stopped since three days, and coughs less, the appetite gets gradually better, and she is improving loss of menses.

W. S. F. Taylor, M. D., Poplar Bluff, Mo., writing under date of June 20, 1895, says: Patient placed on serum immediately received. So far results good. Patient improving nicely. She is so much benefited I desire to keep her on it.

John C. Spencer, M. D., San Francisco, Cal., incumbent of the Chair in Bacteriology, California State University, under date of September 4, 1895, writes: Please accept my thanks for your prompt acknowledgement of my previous communication. The serum arrived simultaneously and has been injected daily for one week, with a marked general improvement in the health of the young man. The physical signs in the lungs have also improved correspondingly. I am keeping as complete data of the case as may be, and shall communicate with you at intervals.

Dr. William Miller, Boerne, Texas, writes under date of September 8, 1895, as follows: I have used the serum now for nearly three months, as you are aware, having received my first supply from New Orleans. Twelve cases in all have been treated by me, and I will send you at an early date a statement of each case. All the cases were in the third stage, 30 per cent at the end of their rope. All very bad cases indeed. I specifically claim improvement in 40 per cent of these cases; 30 per cent received some benefit, and 20 per cent did not improve, and the treatment stopped within ten days of the commencement in these latter cases. I shall continue to use the serum treatment in my practice, and hope to have many patients under treatment this fall and winter. I now have three third-stage cases under treatment. Two are improving very much, and in fact my best cases. They were given up to die by their former medical attendants, and are now walking about.

Dr. Chas. Mills, Marysville, O., February 10, 1896: My patient is doing fairly well. Cough and expectoration has diminished; respirations are slower, double the quantity of food taken; the patient feels stronger and better. Again on November 25, 1895, he writes: I have been using the serum on one case for five weeks and on another for three weeks and must say that I am much encouraged.

Dr. Albert H. Hamel, De Soto, Mo., February 10, 1896: My patient is doing nicely and I believe in a week or two the improvement will be very noticeable.

Dr. Graily H. Hall, San Jose, Cal., December 10, 1895: I have a patient who has gained 10 pounds in three weeks with a proportionate amelioration of all other symptoms.

Dr. Wm. E. Ground, West Superior, Wis., January 30, 1896: I have practically cured a case of incipient pulmonary tuberculosis.

Dr. C. H. Power, Rayne, La., December 26, 1895: I am obtaining good results from the first shipment so far.

Dr. Hoell Tyler, Mentone, Cal., January 2, 1896: I procured the serum, which I took for five months, through the kindness of my friend, Dr. C. C. Browning of Highland, Messina P. O., Cal., and I have no symptoms of the disease left.

Dr. Nat King, El Paso, Tex., December 19, 1895: I have two patients who are doing fine and are proving to be walking advertisements for me. The serum, to my mind, is the thing long sought for.

Dr. Nat King, El Paso, Tex., January 18, 1896: Patients doing very well; one gained 7 pounds in six weeks and cough decreased; one gained 5 1-2 pounds in six weeks.

Dr. J. H. McCutchan, Evansville, Ind., February 17, 1896: I have for several months been following the treatment of numerous cases of tuberculosis in the laboratory of the St. Mary's Hospital. I have been astounded at the wonderful decrease of tubercle bacilli, the improvement in the patient's condition and the change in the appearance of the sputum; altogether the most satisfactory treatment I have ever seen.

Dr. Chas. D. Mills, Marysville, O., February 27, 1896: Patient is quite hopeful; last examination of sputum showed bacilli, but in greatly reduced numbers. My patient has done well and I hope another month's treatment will show further improvement. Her fever has been about normal for two weeks. For four weeks before commencing this treatment she was confined to her bed with fever, night sweats and weakness, with loss of appetite. The latter has improved very materially. She is up now.

Dr. A. G. Deardorff, San Francisco, Cal., January 7, 1896: I can report good progress now in my case. Night sweats entirely ceased. Appetite wonderful; pain in lung all gone and expectoration most gone; coughs but little in 24 hours. He has so improved and it is so much better than anything I have ever seen in phthisis that I am wonderfully pleased with it. I am giving some days 60 m., some 40 and some 50, ranging from 40 to 60. His

stomach will not stand creosote, so have quit giving him that. Again he says January 29, 1896: About the middle of November, 1895, Mr. W. A. S., a friend of mine, appeared in my office, hardly able to walk. The history of his case up to that time was that in August he had taken sick with what was termed Malarial Fever, loss of appetite, night sweats and a very hard cough with profuse expectorations. Soon after he came under my treatment I began to use the serum and I had good results from the beginning of the treatment. The microscope failed to detect the bacilli of tuberculosis for over six weeks after I began the treatment. He had improved nicely during this time. He takes it in my office and in 20 minutes walks out and down the street to his hotel. His appetite is fine. His weight is rapidly improving. There were times when it looked very discouraging but I persisted and now we are conquering the trouble. Last week we made an examination of the sputum and found only one bacillus in four slides, a wonderful decrease in a few weeks time. Physicians should not get discouraged if there is not a big improvement in a short time, but continue on gradually increasing. I now feel as if we have something to give the consumptive a genuine hope in consumption, when before this we have had to say to the patient, "I can do you no good." I consider the Paquin's Anti-Tubercle Serum a success. For a remedy that will do what it has for a case as bad as this one was in so short a time is a thing to be commended. Later on, February 5, 1896, Dr. Deardorff says: Mr. S., of whom I have written you so many times, is fast improving; feeling fine.

Dr. E. B. Shaw, East Las Vegas, January 28, 1896: Miss S. has been under my care and observation for nearly four months and the improvement has been continuous and satisfying. She has gained seven pounds in flesh, her cough is almost nil and her strength and endurance correspondingly increased. On account of the very small amount of expectoration it was some time before a sputum examination could be made. A careful examination showed no bacilli. Although somewhat prejudiced against the treatment in the beginning, I will say that I am very favorably inclined and am quite willing, in this case at least, to give the treatment the credit for the improvement.

Dr. R. W. Seay, Litcher, La., November 14, 1895: On July 4th I began using the serum on a patient with the disease in the incipient stage, and she seems to have entirely recovered after four weeks treatment. She has repeatedly told me so and so has her husband, that she is in better health than she has been for four years. I believe she was benefited by your preparation of serum and write to tell you this beneficial effect.

Dr. J. T. Towey, Muncie, Ill., February 12, 1896: I am much pleased with your Anti-Tubercle Serum. Have been using it but 14 days, with two patients, both of whom coughed almost incessantly and were tortured with a temperature of 101 to 103 morning and evening. Now temperature is normal. No cough, but little hoarseness, and one of my patients has gained 31-2 pounds. This is a great discovery.

Dr. J. L. Maupin, Fresno, Cal., January 2, 1896: I have been using your Anti-Tubercle Serum for the past six weeks and so far can report favorably. I have two case of incipient tuberculosis and have found marked improvement in both. The cough has entirely stopped. No night sweats, and general improvement in appetite and weight. These cases are two young men, ages 21 and 32, and were troubled with cough, pains through both lungs and more or less emaciated when I began treatment. I will continue treatment in these two cases until all signs of the bacilli have been conquered.

Dr. W. A. Jayne, Denver, Colo., January 30, 1896: The two patients upon whom I have been using the serum are doing very well, one showing most decided improvement. Dr. Ruedl, who tells me he is using it on a number of patients, is getting very encouraging results.

Dr. H. E. Stroud, Phoenix, Ariz., January 10, 1896: E. F. I treated all last summer with wine and Cod Liver Oil, Gudes Pepto-Mangan, etc., etc., but he steadily went down. The serum treatment was added to the above. In six weeks he gained 21 pounds in weight and wasted upon stopping.

Dr. J. L. Wiggins, East Saint Louis, Ill., under date of December 19, 1895: In reply to your favor of the 16th ult. in reference to present condition of Miss V. Z., would say, that so far there has been no return of trouble. She continues to gain in general health. Now weighs 132 pounds and has had entire absence of cough since

treatment was discontinued, some seven months since.

Again **Dr. J. L. Wiggins**, E. St. Louis, December 30, 1895, writes: In answer to your query, "Did you consider the case of Miss V. Z. acute tuberculosis?" I will answer, unqualifiedly—Yes. At time of treatment with serum, I had no hopes whatever that case would recover either with or without serum. But as the temperature began to fall, diarrhoea—which before was uncontrollable by medication—was controlled without medication, and the cough and hemorrhage became lessened and gradually disappeared. I concluded that these marks of improvement were more than a mere coincidence. The diagnosis was clear, outside of microscopic analysis. This, in beginning was clouded. I would have filled out a death certificate, had she died, as being the result of tuberculosis.

Dr. James R. Vincent, E. Pittsburg, Pa., writes under date of November 26, 1895: My first patient, a young man, a plumber by occupation, had quite a cavity in left lung, posterior near spine, amphoric breathing, and crackling rales very distinct, bacilli very abundant. He has now had fifty-five injections. Cannot find (myself, nor can others who have examined sputum) any bacilli. Rales are gone, also cough, but still has some temperature, but never above 100 degrees for past three weeks. Patient No. 2 is almost well. Has gained 12 pounds in last two weeks.

Dr. E. Jay Fisk, Troy, N. Y., under date December 18, 1895, writes: I am satisfied with the value of the serum, in every stage of the disease for which it is intended, in well-marked hereditary history; but the most positive action is in the incipency and first stage of hereditary tuberculosis. I am hoping for an hour in which to render a report of some remarkable results obtained, thus far.

Dr. J. A. Dunwoody, Cripple Creek, Colo., March 18, 1896: I have three patients with pulmonary tuberculosis upon the serum alone, and each of them have improved very much.

Dr. G. David Lockie, Chicago, Ill., March 13, 1896: I think I am getting all the results we could look for in my case.

Dr. Richard Fricke, Fort Wayne, Ind., March 12, 1896: My cases (three) are doing very well. To-day I examined the sputum of the case with anthrax. I treated that case for ten (10) days with the serum and the ba-

cilli, of which there were so many, have disappeared entirely.

Dr. Ralph A. Tudury, New Orleans, March 4, 1896: I have been using the Anti-Tubercle Serum for some months past with much success. I have not as yet discharged any of my patients entirely eradicated from that dreadful disease, Consumption, but feel, if some of them continue to improve as they are now doing, it will not be long for the results to be entirely satisfactory.

Dr. William Miller, Boerne, Texas, March 19, 1896: Dr. Miller reports the recovery of a Mr. Molloy. This case had tuberculosis for some years and was treated by the exclusive use of serum. On March 19th, Dr. Miller reports as follows: Examination of Mr. Molloy at Boerne, Tex., March 19, 1896: Pulse, 72—full and strong; respiration, 18; temperature, 98½; weight, 152 pounds. Note—This gentleman has gained twenty pounds (20 lbs.) since he came under the treatment. Chest measure: Expiration, 35½; inspiration, 37½. Respiratory murmur clear and distinct over both lungs—no cough or expectoration.

Dr. Frank T. Lincoln, Savannah, Ga., March 30, 1896: The results from the last bottle were extremely satisfactory. The patient gained two pounds in the seven days, and there was absolutely no systemic disturbance, although I injected as high as 2½ cc. at one time. I hope for the most complete results from the treatment; and if this bottle continues its good effects, shall contract with you for a large supply.

Some Reports of Patients to or for their Own Physicians.

Mr. Frank J. A., the first patient who used the serum outside of the city, under the care of Dr. A. M. Hayden, of Evansville, Ind., writes: It is with great pleasure that I write you to let you know of the improvement that is shown in my case. My physician, Dr. A. M. Hayden, asked me to write to you, as he was so busy that he could not spare the time. He says to tell you that he made an examination of my urine, and that it was in excellent condition. That my weight, which was at the beginning of the treatment 135 pounds, and which fell to 128 pounds, increased to 132 pounds; and that the character of the sputum has entirely changed; while at the beginning of the treatment it was heavy, thick, of large quantity, and when ex-

pectorated in water would sink, it is now of a frothy character, and floats; and I never expectorate at night, where I used to expectorate a half a pint; and my appetite is excellent, am always hungry. The doctor on the whole is much encouraged, as am I. But my being encouraged does not count for much, as they say consumptives are all hopeful. I have just ordered my sixth ounce. Dr. Hayden says any suggestions you would be pleased to make will be highly appreciated by him.

Mr. E. J. Davis, St. Louis, Mo., December 19, 1895: I am feeling all right and have gained 30 pounds since I took the first injection of serum, in spite of the fact that I have been working about 15 hours a day, Sunday included, since August 20th, but I can talk better than I can write.

Mr. W. J. Gibson, Howell, Ind., December 29, 1895: Regarding my case, I will say that after taking three ounces my physician was unable to discover any bacilli in my sputum.

Mr. J. W. Lock, East Las Vegas, February 9, 1896: Five weeks ago the doctors told me there was no hope for me, that I might as well go back home to Illinois. I heard of the serum treatment and commenced using it. I have taken 21 treatments of it and now I am up and around. It has helped me wonderfully. The doctor gives me about 40 drops now. I think it a wonderful cure.

Mr. B. Benson, San Francisco, Cal., February 5, 1896: I have used four bottles of your serum up to the present date. I have been steadily improving. I can now walk a mile with little or no distress and also have a fine appetite and have gained six pounds of flesh. I raise very little and cough very little.

Mr. S. F. Dupree, Bolton, Miss., March 18, 1896: I have been taking your treatment six months now and feel as though I am fully recovered.

Mr. George W. Foster, St. Louis, Mo., December 19, 1895: I am feeling splendid, not an ache or pain, strong and cheerful and "hog fat," 143 pounds. Pretty good for a little fellow, don't you think? (Mr. Foster has recovered from a case of two or three years, from its true incipency. Had severe hemorrhages).

Mr. W. F. Wright, San Francisco, Cal., March 16, 1896: I have read several letters that Dr. Paquin had written himself to Dr. Hall, in reference to my case, as it was a very serious

one and I have received a great deal of benefit from the treatment. I had a very severe cough and had had it for years, and had a hemorrhage for nearly every day for a year and nine months before taking the treatment. There is no more blood at all any more and has not been for six or seven weeks, and practically no cough or raising of any kind. If I had any other disease besides tuberculosis and had made such great improvement, I would say that I was going to be cured; but we all know that lung disease is something that we cannot be sure of. Yet I have the greatest faith in the medicine, as it has done me a great deal of good. I gained fourteen pounds under the Paquin treatment. I had the sputum examined by different doctors when I commenced and also again last week, and it was found that while the bacilli were as thick as could be in the beginning, they were practically gone in the last examination. I should like to have you continue to send the serum as you have in the past, that is, an ounce every eleventh day, until you hear from us. San Jose is fifty miles south of San Francisco and I come up here every morning and go back every evening now that I am feeling so well.

Untoward Symptoms in Sero-Therapy.

That the use of serum is not entirely harmless is well proven by the various local untoward symptoms, as well as the general disturbances which occasionally occur after its use. It is a potent remedy that should be used only by physicians mindful of their interests and that of their patients. It is not sufficient for one to inject serum mechanically and leave the patient to his fate. It is necessary to watch the case carefully and constantly, just as one would have to do in using strychnine or morphine hypodermically. Among the untoward symptoms that may result from the use of serum I will mention the most common ones, viz: Urticaria, Erythema, and other forms of eruptions, local swelling at the point of injection, swelling, pain and stiffness in the articulations (particularly in patients with rheumatic diathesis), temporary sensations of numbness in one arm or leg, occasionally pain in the spine, back of the head, and stomach, nausea. These symptoms, however rare, should be considered carefully and patients

exhibiting them should be treated with very small doses at first, increasing very gradually. If the symptoms persist, discontinue injections and use eliminatives and begin treatment again after previous condition is re-established. One occasional symptom which presents more ugly features than danger is the occasional sudden disturbance of the circulation, accompanied by a flushing of the face, sometimes to a purple color, sometimes followed with rigors. This peculiar disturbance seems to be of vasor-motor origin, but we are not positive of that. It is more common when serum is injected directly in a vein or in a spot where several injections have been made previously. There are patients who seem to have a predisposition to these disturbances and it is, in such cases, better to use per rectum (see p 39). Over 50,000 injections of serum have been made for the treatment of tuberculosis and in no case has there occurred a serious accident and all disturbances so far have been mild and comparatively rare. Fortunately, all of the untoward effects (caused by hypodermic medication) may be avoided by using the serum in the lower bowels, with an ordinary glass or rubber syringe, as may be seen from the directions. The results are promising.

The Specific Effects of Paquin's Anti-Tubercle Serum on the Germ of Tuberculosis.

The following illustrations demonstrate the results obtainable in pulmonary tuberculosis. Each cut represents the appearance of the *worse slides of the month of the weekly mounts made from the sputum of the patients represented*. In order to spread and scatter the microbes evenly, the sputum was treated with a caustic potash solution. By this means the number and ratio of germs is fairly estimated. All three of these cases have returned to their duties as recovered.

CASE A.—38 years, male; ill over two years; second stage; slight softening at beginning of treatment.

CASE B.—Mrs. R., aged 30; ill three years; slight hemorrhages; weight beginning of treatment, 110 pounds; weight after six months' treatment, 132 pounds. Recovery.

CASE C.—Mr. K.; ill eight years; sweats, chills and fever; large cavity; hemorrhages; very feeble, and weighed 160 pounds at beginning; now strong, and weighs 189 pounds. Case now attending to his duties.

CASE A.—First Month.



Bacilli of Tuberculosis numerous. A few pus microbes.

CASE A.—Second Month.



Bacilli of Tuberculosis still numerous. Many pus germs.

CASE A.—Third Month.



Bacilli and pus germs greatly diminished.

CASE A.—Fourth Month.

Bacilli of Tuberculosis absent for five weeks. A few cocci present.

CASE B.

Bacilli in sputum at beginning of treatment. No pus germ.

CASE A.—Fifth Month.

Eruption of previously immature Tubercles in the lungs, with re-appearance of bacilli, which remained present six weeks.

CASE B.—Second Month.

Bacilli disappearing. No pus germ.

CASE A.—Sixth Month.

Slides in latter part of sixth month and in the three months elapsed since have failed to exhibit any bacilli. A few cocci of little consequence occasionally present. Case recovered.

CASE B.—Third Month.

Bacilli still more reduced in number. No pus germ.

CASE B.—Fourth Month.

No bacilli of Tuberculosis. Very few other microbes. Bacilli never appeared in six months elapsed since.

CASE C.—Fifth and Sixth Months.

Bacilli of Tuberculosis reduced in numbers.

CASE C.—First Two Months.

Presence of both the bacilli of Tuberculosis and of pus germs in about equal quantities.

CASE C.—Seventh and Eighth Months.

Bacilli of Tuberculosis absent. Considerable number of pus germs present. Expectoration slight. Case returned to work.

CASE C.—Third and Fourth Months.

Same microbes still present in about same ratio and quantity.

Unfavorable Cases of Consumption for Sero-Therapy.

It is an unfortunate fact that consumptives and their physicians seek new treatments in the majority of cases only when the disease has advanced beyond repair. In the first and second stages, particularly in the first, the disease can be arrested if the treatment is persisted in. But in a large number of patients in any part of the third stage, and later, of course, permanent good results cannot be common. It will be seen by the reports presented in this publication, what class of patients may be expected to be benefited. Inasmuch as there seems to exist no other treatment than sero-therapy to benefit any form of consumption, the

physician is justified in trying it in almost any case, but patients should always be advised as to the probable results, and no bad and advanced case should be promised great benefits. No one can tell what difficulties may arise and what serious barriers may appear in the course of treatment of broken-down tuberculous individuals. As a general rule, it may be said that all cases in the last stage, whether accidental or not, should be considered poor subjects for sero-therapy. All advanced cases with a hereditary taint are unfavorable for the use of serum, though several of them have been benefited. All advanced cases with general infection, mixed infections, particularly those with parchment skin, or skin adhering tightly to the connecting tissue, accompanied with more or less persistent fever rising above 102, are not favorable cases. On the other hand, it is scarcely necessary to say that all cases with contracted lungs, fibrosis, large cavities, extensive softening, due in part at least to other germs than the bacillus of tuberculosis, cannot be expected to yield very readily to the serum. If physicians will select proper cases, taking them early, they will usually be gratified with the results of the treatment. Great care should be exercised to establish the true nature and stage of the disease.

The best guide for the physician is the nature of the cases reported here or elsewhere, as having improved or recovered under the influence of serum. **Still, great good has been accomplished in all forms of Consumption.**

Response to Criticism.

Only a few words will be said here in response to the few criticisms against the use of the serum in tuberculosis. The majority of them are based on failures of serum in moribund cases and should not be considered for a moment. Others are based on very limited and cursory experience with the serum; others again on improper diagnosis, that is to say, cases which the physician had supposed to be in the first stage and which were in reality nearer the last. Anti-Tubercle Serum is as just and rational as any other kind of serum for any other infectious malady. But one must remember that tuberculosis, excepting in pure acute cases, is a disease in which not only the toxins produced in the system play a serious part and must be taken into account in the application of the remedy, but also the lesions which, of themselves, are often sufficient to eventually destroy life, particularly when they are such as afford other microbes than the bacilli of tuberculosis; proper nidus for their existence and development. There occurs from this, most serious complications. The destruction of tissue, pus formation and general poisoning of the system by these bacteria cannot be reached by the Anti-Tubercle Serum alone. Other remedies, including disinfecting inhalations should be used. We hope to produce an effective mixed serum for these mixed infections in due time.

METHODS OF ADMINISTERING Paquin's Anti-Tubercle Serum.

The dose may vary from 5 to 120 drops daily (less than $\frac{1}{2}$ cc. to 8 cc.) or every other day, according to age, local and general effects and results. It may be diluted or undiluted with sterile water. The best point for injection seems to be the back, toward the sides, three or four inches from the spinal column, and about midway between the scapula and hip. The average hypodermic daily dose is 30 drops (about $2\frac{1}{2}$ cc.).

In cases where any serious untoward symptoms arise, the serum may be used *per rectum*. The average dose by this method, according to age, is 30 to 60 drops daily or twice a day—240 drops may be administered to an adult—diluted in about an ounce of tepid distilled or boiled water. The absorption by this method, according to reports received, is prompt, and the results very promising. There is now no need of abandoning cases which cannot receive hypodermic medication without some bad effects locally or on the constitution. The serum may be introduced in the lower bowels, with an ordinary small glass or rubber syringe, and even a young child may thus be saved.

The PAUL PAQUIN LABORATORIES are the exclusive agents for
the South and West of the United States for the

ANTITOXIC SERUMS

— PREPARED AT THE —

British Institute of Preventive Medicine.

For DIPHTHERIA.

In cases of three tubes, each containing
10 cc.,

For TETANUS.

In tubes of 3 grammes dried serum.

The value of Diphtheria Anti-Toxine has been so well established that it is scarcely necessary to say a word in commendation of it. The only point that we wish to bring to the attention of the medical profession is, that the British Institute of Preventive Medicine, under the direction of Dr. Armand Ruffer, is one of the most advanced institutions of its kind in the world, and is conducted under thoroughly scientific principles. Dr. Ruffer's world-wide reputation is a sufficient guarantee that the products prepared under his direction are thoroughly reliable, and cannot be surpassed by those of any one in any part of Europe or America.

TETANUS ANTI-TOXINE.—This is prepared by inoculating animals with a weakened culture of tetanus bacilli. The serum of such animals contains an anti-toxine inimical to the specific bacillus. It has been used with considerable success, chiefly by Tizzoni and Catani, in Italy. There are also several successful cases on record in England. It is supplied in a dried state, and when required for use is dissolved in cold water. It is used in human medicine and veterinary practice.

Besides the Diphtheria and Tetanus Serums we will soon be in a position to supply, from the same institution, the Streptococcus Anti-Toxine, Tuberculine and Mallein.

DIPHTHERIA ANTI-TOXINE

— OF THE —

PASTEUR INSTITUTE OF PARIS, FRANCE.

The Paul Paquin Laboratories are pleased to announce that they are prepared to distribute Diphtheria Anti-Toxine of Roux, of the Pasteur Institute, Paris. No word of explanation is necessary to set forth the value of Roux's preparation. The discovery of diphtheria anti-toxine was by Roux and Behring, and the products of the two scientists are equally reliable.

Price-lists of these foreign Serums and of Paquin's Anti-Tubercle Serum will be supplied on demand of

The PAUL PAQUIN LABORATORIES,

No. 3536 Olive Street, St. Louis, Mo.,

Producers of Anti-Tubercle Serum.